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ACUTE PERICARDITIS DUE TO THE STREPTOCOCCUS VIRIDANS*

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SHREVEPORT

Acute pericarditis is, with few exceptions, the result of secondary invasion of the pericardium from some other primary source. It occurs therefore as a complication or incident in some other disease, and has been found associated with various diseases. A rather wide variety of organisms have been the responsible agent but the *Streptococcus viridans* so rarely that such a case is worthy of reporting.

CASE REPORT

Mr. H. C., 16 years of age, was seen on September 25, 1942, complaining of a severe pain in the lower anterior portion of the chest, radiating backward between the shoulders and aggravated by respiration and moving. It was necessary to give him morphine for relief and he was moved to a small clinic in his home town. During the next four days he continued to be quite uncomfortable and had some fever. An x-ray of his chest made on September 26 showed some apparent cardiac enlargement and a second plate made on September 30 showed considerable enlargement of the heart shadow. He was then brought to Shreveport where I saw him on the evening of September 30. When seen he was quite uncomfortable, having some pain in the chest, and dyspnea.

His mother stated that he had had a rather severe cold for two or three days during the first part of September. Apparently he had recovered but about four or five days prior to the present illness was not quite well. He had previously been a normal, healthy boy, had had two mild attacks of influenza and bronchopneumonia as a small child. His father and mother were both living and well, 38 and 36 years of age, and he had one sister, 12 years of age, living and well.

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On examination he appeared acutely ill, pale and somewhat cyanotic. He was well developed and nourished with no skin eruptions and no adenopathy. The pupils were equal and reacted to light and accommodation. The teeth were in good condition and the tonsils only slightly enlarged. The area of cardiac dulness was increased both to the left and right, the left border extending outside the midclavicular line. The rhythm was regular, at a rate of 100. The heart tones were good and there were no murmurs. The blood pressure was 120/80. The lungs showed no areas of dulness and the breath sounds were normal. The liver was palpable about 3 cm. below the costal border and quite tender. The remainder of the physical examination was essentially negative.

On fluoroscopic examination the cardiac shadow was enlarged to the right and left with rounding out of the borders and no visible pulsations. Pericardial paracentesis was performed, obtaining about 50 c. c. of turbid, straw colored fluid. Smears from the fluid showed a moderate number of leukocytes but no organisms. Culture was reported as positive on October 2, 1942 for the *Streptococcus viridans*.

An electrocardiogram made on October 1 showed an elevation of the ST segments in Leads I, II, IV, with inversion of T3. The changes were interpreted as indicative of acute pericarditis.

He remained in the hospital from September 30 to November 6, 1942, and was then removed to a convalescent home where he remained until December 8, 1942. During his stay in the hospital he ran a febrile course, the temperature varying from 98.6° to 102°, during the first ten days. On one occasion it reached 104.6° following transfusion of 500 c. c. of citrated blood. A characteristic paradoxical pulse was present, the rate varying from 80 to 120 and the respirations 20 to 30. During the next week the temperature varied from 98° to 100° and during the last week from 97° to 99°. On October 4, a pericardial friction rub was heard, which persisted for about four days. During this same period he developed a pleural rub in the left axilla which persisted for two or three days. On October 5 the pericardium was again aspirated, withdrawing about 50 c. c. of blood-tinged fluid, which on culture

showed the *Streptococcus viridans*. Blood cultures on September 30 and October 5 were reported as positive for the *Streptococcus viridans*.

During the second week he developed ascites and fluid in the right pleural cavity. For the first two weeks the blood pressure remained at about 120/80, then the systolic pressure gradually fell to 100 on October 19. At that time dyspnea was quite marked so that pericardial paracentesis was attempted but no fluid was obtained. On fluoroscopic examination the cardiac shadow was smaller, but no pulsations were visible and there was considerable fluid in the right pleural cavity which was aspirated on October 23, obtaining 1010 c. c. of straw-colored fluid with considerable relief from the dyspnea. Venous pressure, direct method, at that time was 24 cm. During the remainder of his stay in the hospital his condition improved, the dyspnea was less, the ascites decreasing, and the size of the cardiac shadow on fluoroscopic examination becoming appreciably smaller.

He was started on sulfanilamide on October 2, 80 grains every 24 hours and continued to October 5 with no effect on the temperature. He was then given sodium salicylate gr. 20 every four hours for five days, then gr. 20 four times a day until October 19, with no apparent effect. On October 19 he was again given sulfanilamide gr. 20 every four hours for five days, then gr. 20 four times a day for one week, and then gradually reduced to gr. 10 three times a day on November 4. The sulfanilamide blood level on October 24 was 16.6 mg. per 100 c. c. and on October 31 was 15.4 mg. per 100 c. c. The other laboratory reports are shown in chart No. 1. He was given salyrgan on three occasions with fair diuresis.

CHART No. 1

Date	Red Cells	White Cells	Sed. Rate	Ven. Pres.	Blood Pres.	Blood Cult.	Pere. Cult.
9/30	3,990,000	15,000				Alpha	Alpha
10/4	3,580,000	16,850			110/60	Strept.	Strept.
10/12	4,320,000	17,450				Alpha	Alpha
10/22				24	110/60	Strept.	Strept.
10/28				23	110/80		
11/4				21			
11/13	4,040,000	11,500	36	20	120/80		
11/24	4,040,000	9,250		17		Negt.	
12/3	4,220,000	11,950	45			Negt.	
12/5				15	130/80	Negt.	
1/11	5,330,000	7,800	10	8		Negt.	
2/15	5,620,000	13,050	10	7	124/80	Negt.	
4/5	5,380,000	5,700	10	6	124/60	Negt.	

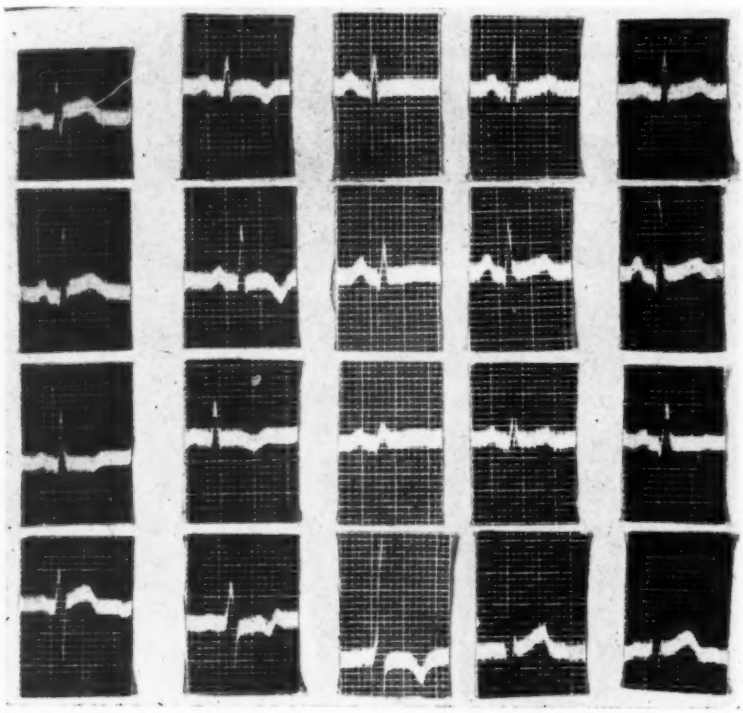

Fig. 1. Reading across the page are the four standard leads. Column 1, October 1—Elevation ST segments in leads 1-2 and 4F and disphasic T in lead 3. Column 2, October 19—Inversion of T in leads 1-2-3 and diphasic (minus plus) in T in lead 4F. Column 3, December 8—Isoelectric T in lead 1, slightly upright in leads 2 and 3 with small Q and an inverted T in lead 4F. Column 4, January 11 and April 5—Normal tracing.

He remained in a convalescent home from November 6 to December 8. During this time his temperature varied from 98 3/5° to 100 3/5°, but on November 23 the temperature rose to 102° for three days. At that time there was a loud pleural friction rub on the left anteriorly and in the axillae. A pleural rub had previously been heard in the right and left axillae and anteriorly on occasions. Following this the temperature gradually returned to normal and remained there during his last week at the convalescent home. During this time the ascites, enlargement of the liver, dependent edema, and dyspnea gradually improved so that for the last two weeks he was free of these findings. He had continued to take sulfanilamide gr. 20 daily, vitamins and ferrous sulphate. Quinine had also been given at first, gr. 20 daily, then gr. 10 daily. He was sent home on December 10.

He returned for examination on January 11, February 15, and April 5. He had continued to improve, the temperature seldom reaching 99° F., and had gained 37 pounds, his weight on April 5 being 162 pounds. The heart was of normal size, the rhythm regular at a rate of 84, tones good, and the blood pressure 124/60 and the venous pressure 6 cm. Fluoroscopic examination showed the heart to be of normal size with vigorous pulsations. The laboratory findings are shown in Chart 1. It is to be noted that blood cultures have been consistently negative since November 24. Figure 1 shows a series of electrocardiograms from October 1, 1942 to April 5, 1943, showing characteristic changes in the ST segments and T waves. Figs. 2 and 3 show x-ray of chest made on October 15, 1942 and April 5, 1943, the latter showing return of the heart shadow to normal.

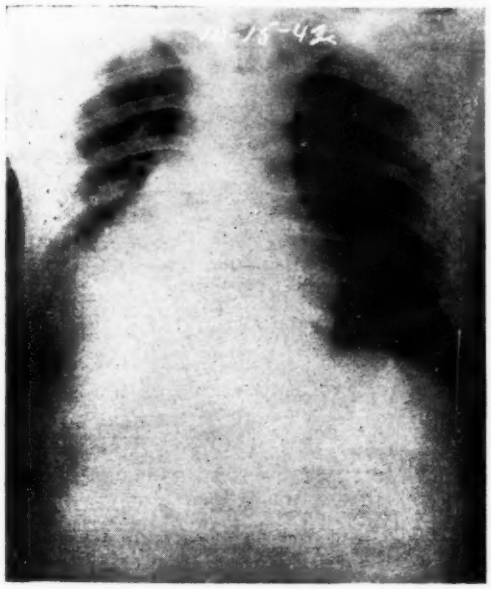

Fig. 2. Roentgenogram of October 15, 1942, showing marked increase in the size of the heart shadow.

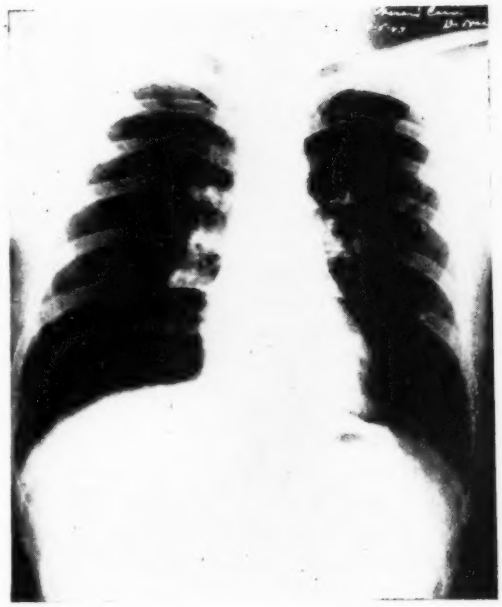

Fig. 3. Roentgenogram showing the return of heart shadow to normal.

COMMENTS

Following an upper respiratory infection this boy developed a *Streptococcus viridans* septicemia, complicated by an acute pericarditis which ran a stormy course. The *Streptococcus viridans* was found on culture on two occasions from the blood and pericardinal fluid. Pericarditis due to this organism is rather infrequent. Carter,[1] quoting Thayer's figures, gives the incidence of *Streptococcus viridans* pericarditis occurring in the course of subacute bacterial endocarditis due to this agent as 2.7 per cent among 72 cases and 7.4 per cent among the 27 who came to autopsy. Preble, in 1901, according to White,[2] reported 244 cases of acute pericarditis, 4.7 per cent of which were due to sepsis, but the type of organism was not mentioned. Bigger[3] reported eight cases of suppurative pericarditis operated upon, but none due to the *Streptococcus viridans*. Barnes and Burchill[4] reported 14 cases of acute pericarditis

simulating acute coronary occlusion. None of their patients were quite as sick as this boy, they were older and there was the question of coronary occlusion in the differential diagnosis. A preceding respiratory infection was noted in 57 per cent of their cases but no definite etiology was established though some type of streptococcus may have been the agent. Adams and Polderman[5] reported 20 cases of suppurative pericarditis occurring at the Massachusetts General Hospital, during the past ten years, three of which were due to the *Streptococcus haemolyticus* but none to the *Streptococcus viridans*. Orgain and Poston[6] reported a case of pericarditis due to the meningococcus. I reviewed the autopsy records of the Shreveport Charity Hospital and was able to find 20 cases of pericarditis from 1936 to 1943. The etiologic agent was: rheumatic infection, three; tuberculosis, six; pneumococcus, five; B. influenza, one; uremia, four; staphylococcus, one; streptococcus and staphylococcus, one; syphilitic, one; and undetermined, three.

This is a very incomplete review of the literature, but it at least indicates that acute pericarditis due to the *Streptococcus viridans is a relatively rare disease*. In this instance the disease ran a rather stormy course, so much so that the outcome was somewhat doubtful. Sulfanilamide was used though we realized that the *Streptococcus viridans* is not usually affected by the drug. We have been concerned about the possible development of adhesive pericarditis. Thus far the recovery has been excellent and perhaps we may dismiss this possibility.

The diagnosis of acute pericarditis is often difficult and is frequently missed largely because its symptoms are overshadowed by the primary disease. If pain, dyspnea, pericardial friction rub, and a rapid increase in the size of the heart are present the diagnosis is evident. Pain though is not a constant finding, in fact is a very variable finding, its absence being not unusual. Dyspnea may or may not be a prominent symptom and when present may be due to complications as simple pleurisy or diaphragmatic pleurisy. A pericardial friction rub is probably present at some time in all cases, but may be absent at the time of examination. It should of course be listened for frequently. The area of cardiac dulness is increased markedly with large effusion but if the effusion is small or absent there may be no appreciable increase. Rapidly developing effusions or large effusions produce cardiac tamponade with increased venous pressure, venous distention, enlarged liver, and ascites. If these characteristic symptoms are present or develop during the course of some disease we should think of pericarditis at once.

There are three other procedures though, that are very helpful in making the diagnosis or focusing one's attention on the pericardium. They are the electrocardiogram, the x-ray and pericardial paracentesis.

The electrocardiogram often shows changes quite characteristic of acute pericarditis. A number of articles[4, 7, 8] have appeared in the literature during the past seven or eight years on the electrocardiographic findings in acute pericarditis so that the changes expected are definite. Briefly they consist of an upward displacement of the RS-T segments in the standard leads which shortly diminishes or disappears altogether, and is followed by negative T waves. Frequently the T wave will be negative in all the standard leads, a finding in itself indicating pericarditis though it may be seen after acute coronary occlusion or after a second acute coronary occlusion. These changes are distinguished from those due to coronary occlusion, by an absence of Q and T patterns, absence of the reciprocal deviation of the S-T segments in Leads I and III, and the presence of R4. Aside from these differences the rapid return of the tracing toward normal is an important feature of pericarditis. The electrocardiographic changes are generally conceded to be due to subepicardial myocarditis.

It would seem wise to have electrocardiograms made during the course of infec-

tions, particularly septicemia, pneumonia, and osteomyelitis, or at least when there may be some suspicion of pericardial disease. Frequently the changes will be characteristic, establishing the diagnosis or at least inspiring additional investigation.

The x-ray is also quite helpful. A rapid increase in the heart shadow as occurred in this patient is always suggestive of pericardial effusion. If the larger shadow shows a rounding out of the borders, a foreshortening of the vascular shadow, a prevalence of T over L, and no or only slight pulmonary congestion one may be reasonably sure of the diagnosis. Fluoroscopic examination when possible has been more helpful since in addition to the above the degree of pulsation is evident. The absence of pulsation even without much enlargement is an important diagnostic point. Clinical improvement in this case in so far as the effusion was concerned coincided with the decrease in size and return of pulsations as noted on fluoroscopic examination.

Pericardial paracentesis should be performed in most patients in whom the diagnosis of pericardial effusion has been established or is in question. Carefully performed the procedure is not dangerous and should definitely establish the presence of an effusion and its type. Usually the responsible organism can be determined by smear, culture, or animal inoculation and the proper therapy instituted. Other than as a diagnostic procedure pericardial paracentesis should be performed only when cardiac tamponade is producing circulatory embarrassment.

SUMMARY

Report of a case of acute pericarditis due to the *Streptococcus viridans* which followed an upper respiratory infection.

2. A partial review of the literature indicates that this is a rare infection of the pericardium.

3. The use of the electrocardiogram, x-ray and pericardial paracentesis are commented upon.

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NEW AND IMPORTANT APPLICATIONS OF CARBON TETRACHLORIDE IN MEDICAL THERAPY*

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INTRODUCTORY

An apology is in order for not revealing in the title of this paper the diseases that may benefit by treatment with carbon tetrachloride.

There exists among many physicians a prejudice against this compound. The medical literature records a relatively small number of severe intoxications and a few fatalities. Yet, carbon tetrachloride is no worse offender to health than other potent solvents. As with other potent drugs, carbon tetrachloride should not suffer the fate of disuse because of inadequate studies and prejudices.

My attainment of satisfactory therapeutic responses without unpleasant reactions justifies the presentation of results.

The underlying principles that determine the action of carbon tetrachloride on various biological systems, may lead to the discovery of more efficacious procedures of therapy in certain ailments and to the finding of superior drugs.

I have maintained a reluctance in publish-

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ing the newer uses of carbon tetrachloride because lay persons may readily proceed to unrestrained medication. On the other hand, there is an urgent need for certain simple emergency remedies among all branches of the armed forces. Carbon tetrachloride is a drug that may, in part, fill this need.

Carbon tetrachloride is one of the more important solvents in the chemical industry. As a solvent of fats and plastics, it mixes readily with various inflammable solvents, rendering the mixture non-inflammable and non-explosive.

Modern dry-cleaning establishments use carbon tetrachloride as the principal cleaner. It is, however, only a smaller constituent of household dry-cleaning fluids.

Of particular interest is the utilization of carbon tetrachloride in certain types of fire extinguishers.

Toxic manifestation from carbon tetrachloride, involving a few fatalities, have been reported. It appears established that chronic inhalations of considerable concentrations are required.[1, 2] Sudden acute intoxications have been few and readily accounted for.[3, 4] With installation of closed systems for handling the fluid and forced ventilation against the fumes, the dangers are eliminated.

As a causative factor in contact dermatitis the incidence appears low in comparison with other solvents.[5] This is in part borne out by its former use as a dry method of hair shampoo.

The discovery of anthelmintic effect, particularly against hookworms, led to its acceptance as an official drug in the United States Pharmacopeia. This property is shared with the less toxic tetrachlorethylene and hexachlorethane. A mixture of gasoline and carbon tetrachloride has been suggested as a remover of adhesive, primarily to avoid the hazard of inflammable ether and benzene.[6]

An additional use of carbon tetrachloride was reported in 1942, as an anti-pruritic remedy against red-bug or chigger bites.[7]

APPLICATION TO DERMATOPHYTOSIS

A new and important use of carbon tetrachloride was the discovery that the solution is an efficacious remedy in the treatment of dermatophytosis. Clinical experiments since 1930 had indicated that benzene and gasoline alone were effective in curing trichophyton infections. Assuming that the therapeutic values resided in the fat solvent action, search for an available non-inflammable agent of low cost led to the trial of carbon tetrachloride.

The choice revealed further advantages. The solution could be applied to open sores and fissures which complicated the fungal infection; local pain was relieved promptly, and an area threatened with secondary infection was brought under control.

With the object of enhancing and prolonging the efficacy of carbon tetrachloride, a formula was evolved to include a small amount of gasoline, a fungicide like copper in the oleate form, and thymol to represent the volatile oils.

The results reported here concern carbon tetrachloride alone. The tricophyton infected areas have involved all sections of body surface. Some patients had received the limit of x-ray therapy, others faced surgical avulsion of nails. A few patients have been physicians who despaired at results of conventional therapy. Others had been unsuccessfully treated by dermatologists. Bacteriological cultures were not employed.

The solution is preferably applied topically with a cotton or gauze sponge. Gentle frottage is incorporated, as if one were "dry cleaning" a grease spot on clothing.

Two or three minutes only are spent over an area involving the toes of one foot. Immersion of suitable body parts are only suggested for larger pathologic areas and a maximum time limit for immersion set to one minute.

Twice daily treatments are suggested for the first week. Henceforth a daily treatment is maintained for three weeks, and, if warranted, continued as a hygienic measure to offset reinfection.

Preliminary cleansing with soap and water is discouraged. The adopted dry-cleaning procedure will more effectively remove dirt and debris, and infectious hazards are decreased. Contaminated sponges and tissue paper are readily collected in paper bags for disposal. It follows as a sanitary measure, that less pollution of floors, bath tubs, and towels may be expected.

No ointments are applied. Dressings are rarely needed. Minor ulcers and fissures are adequately "desiccated" in a first treatment with carbon tetrachloride, leaving a condition adequately cared for by suitable dusting powder.

The simplicity and convenience of the carbon tetrachloride procedure renders the patient cooperative to continue the very essential prophylaxis against future reinfection or recurrence. The prompt control of signs of possible recurrence by the use of carbon tetrachloride, or the compound formula, contributes appreciably to the desire to use this procedure.

In ringworm infection of toe and finger nails, it has been possible to avoid surgical avulsion. Incipient perionychia yields to the same treatment. Application of the solution is continued until full length of new nail has taken place.

APPLICATION TO BURNS

A second and new use of carbon tetrachloride is as a remedy for all degrees of burns of smaller dimensions.

The application of carbon tetrachloride to a human burn has been followed by almost immediate subsidence of the pain. At no time has there been a subsequent return of the pain when initial treatment involved a 15 to 20 minute contact with the solution.

When the solution was applied within a few minutes of the accident, vesication was either totally prevented or materially minimized. In some instances the results in 24 hours gave little evidence that a severe burn stimulus had been present.

The application of carbon tetrachloride to the human corium, which became exposed at variable periods of time following a heat burn, has led to immediate cessation of serum oozing.

The phenomenon has not been accompanied by any evident tissue coagulation as by tannic acid, astringents, or styptics.

What might be interpreted as a pliable covering, permitted visualization of underlying structures. In no instance has a pyogenic infection developed in the areas that received the solution. The strange results obtained in the first few cases with carbon tetrachloride alone were corroborated subsequently when one-half per cent butesin was incorporated in the solvent.

Clinical material at a local industrial plant was made available. The majority of the burns here resulted from hot asphalt and tar, ranging in temperature from 250° to 450° Fahrenheit. (The adherence of asphalt to the skin is an indication in itself of a temperature sufficient to create a burn.) The latent heat of the product prolongs the exposure to the heat stimulus and may suggest the degree of burn.

The services of a 24-hour medical dispensary at the plant made possible the administration of treatment within a few minutes, and effectively to observe the patients at daily or hourly intervals.

It is pertinent to the problem of toxicity of carbon tetrachloride to indicate that this industrial plant has for several years employed carbon tetrachloride as the only efficacious and safe solvent for the removal of asphalt in burns. The immersion of body parts in the solution for as much as 40 minutes has been necessary and has not given rise to toxic manifestations or complications.

The burns from asphalt at this plant have involved toes, instep, legs, hands, forearms and the face. A few burns from scalding steam and hot pipes have been studied elsewhere. The initial treatment by contact application with tetrachloride alone, or in combination with one-half per cent butesin, produced an immediate effect suggesting subsequent open-air treatment, if feasible. This was modified to consist of a dusting powder, containing a small amount of zinc

stearate and boric acid over which a very light gauze dressing was applied. Vesicles that were evident on the next day's examination received a contact application with carbon tetrachloride for three minutes. The vesicles were then lanced, drained and the epidermis allowed to collapse on the corium. This epidermis remained attached when the "dry" dressings were continued. When an ointment was applied the epidermis softened and became readily detached in a few days.

It is suggested that a burn presenting itself with vesicles within a few hours of the accident, should receive the 20 minute contact application of carbon tetrachloride, have the vesicles lanced, the epidermis collapsed back, and then receive a contact application with carbon tetrachloride for a few additional minutes before applying the dusting powder.

The injection of carbon tetrachloride into a vesicle has been contemplated and might be used to check the corium from further oozing of serum. But where subsequent accidental trauma may lead to rupture of the vesicle, the initial procedure affects a similar arrest and is probably more desirable. More than two treatments with carbon tetrachloride, or its combination, have not been necessary, except that carbon tetrachloride has been used to clean off the burn areas and fresh dusting powder applied on subsequent examinations. Three burns on the face with freshly exposed corium have been treated without dressings, leaving no disfigurement and relatively "healed" within four days.

The prompt relief of pain, the avoidance of secondary infection, and use of minimal dressings facilitated the patient's return to work with little loss of time.

When the burn injuries were confined to the hands and forearms, a prompt functional capacity was restored.

The entire healing process suggested a substantial reduction in time. Scarring or exfoliation of epidermis has not taken place, nor has any evidence of keloid formation been present.

None of the burns treated to date required debridement. The reactions of the carbon tetrachloride on granulating tissue filling a burn cavity have not been studied, but separate evidence on venereal sores indicates a temporary arrest of serum and leukocyte flow to the surface.

APPLICATION TO OTHER DERMATITES

The anodyne effect and the apparent disinfectant powder of carbon tetrachloride suggested its trial in other skin conditions. Two cases of herpes zoster over the groin received prompt relief of pain, and the vesicles underwent rapid involution. The "dry-cleaning" method was applied successfully to two cases of multiple furunculosis of the armpits; to two cases of "sycosis barbae"; to a case of staphylococcal pyodermia covering the buttock and sacrum. In a case of impetigo of the forearm the contact application of carbon tetrachloride permitted the removal of the crust better than with hydrogen peroxide. Claim to hastened healing in this case was not warranted. In a case of tinea cruris, resembling the imprint of a Texas saddle, extensive folliculitis over the buttock subsided with the ringworm therapy.

COMMENT

The rationale of the several medical applications to which carbon tetrachloride has been put is not readily explained. We know little of the role of lipoids, fats and waxes in animal metabolism, and nothing of the role of fat solvents in biological systems,[8] yet, it may be possible to appraise a mode of action.

Carbon tetrachloride and two chlorinated hydrocarbons, tetra-chlorethylene and hexachlorethane possess anthelmintic properties. The ingestion of fats along with the above substances enhances toxic effects for reasons unknown.

The related chloroform, where one chlorine atom is replaced by one hydrogen, vesicates the skin, whereas carbon tetrachloride does not. Both compounds possess similar general anasthetic effects. Liver damage is similar but varies in intensity.

The prompt analgesic effect, obtained under conditions of a heat burn, may indi-

cate a vital degree of penetration of carbon tetrachloride into dermal structures; and a possible important action on peripheral nerve endings of various types. The relief of pain raises the question: Is it pertinent or indifferent to the problem of heat burns, whether pain perception is blocked in the brain by morphine or blocked at the site of injury by different local anesthetics?

A possible answer may be provided by sequence of events in burns treated with carbon tetrachloride.

The prevention of vesicles, after thermal stimuli that experience indicates should raise a vesicle, may reside in the arrest of protopathic impulses and the prevention of reflex phenomena to the site of the burn.

The absence of edema and the prompt restoration of functional capacity, when burns occurred on hands and forearms, have suggested a parallel effect to the injection of novocain in ankle sprains.

A beneficial interference with non-nervous tissue is suggested by the arrest of serum oozing from exposed corium. No explanation can be offered now for the transparent semi-dry "coating" that is formed. The speed of healing with absence of exfoliation suggests a minimum of local lethal effects to the epithelial cells.

The relative state of dryness initiated by carbon tetrachloride suggested the adoption of "open-air" after treatment when feasible. A satisfactory and necessary substitute proved to be the use of a dusting powder and light dressing. The use of ointments resulted in a state of moist surfaces, and caused the epidermis from collapsed vesicles to float off after a couple of days.

The contrast of the two procedures justifies a meticulous inquiry as to the actual harm that may result from the paraffin molecules coating granulation tissues and exposed corium. The interference with surface respiration and the accumulation of sweat at the interphase are conducive to a disturbed local physiology and to infection in spite of antiseptic medication in the ointment.[9]

Inferences from smaller burns have in the past been difficult to carry over to larger burns. The use of carbon tetrachloride within minutes of a burn, sets in motion physiologic forces that hitherto have been poorly and belatedly dealt with. Only clinical trials can determine the effectiveness of carbon tetrachloride as a first-aid in a large burn and its part in the permanent subsequent therapy.

The results obtained in dermatophytosis, while less dramatic than those in burns, assume significance by attempting to explain the fundamental principles involved.

Fat solvents are used in the dry-cleaning industry principally to remove dirt. Publications on its relationship to bacteriology are exceedingly scant.

Ether and benzene are casually used to remove grease from the skin, preliminary to thorough scrubbing in surgery. That these fat solvents are independently capable of potent fungicidal and bactericidal property is not part of our conscious thoughts. Nor is this concept mentioned in any textbook on bacteriology or in separate treatise on disinfection and sterilization.

Paradoxically, biochemistry furnishes interesting information. The addition of chloroform in pepsin digestion experiments on meat; the addition of toluol or xylol or chloroform to a 24-hour urine specimen for analysis, and again, the pharmacist's addition of chloroform to percolating herbs, are illustrations of bacteriostatic action by the vapor phases of the respective fat solvents.

Simple experiments in vitro will illustrate the lethal and static effects of carbon tetrachloride and other solvents, by their vapor or liquid phase. That a lipoidal fraction participates as a protection of bacteria and plant cells is suggested by certain extraction procedures.

The application of a fat solvent in dermatophytosis and sundry skin infections involves in principle an attack upon the lipoidal and fatty barrier in the skin itself and a simultaneous attack on the lipoids of the fungi.

The conventional forms of treatment ignore largely this "fatty" barrier. They depend on keratolytic power, penetration

of dyes and alcoholic medicaments. To the extent that ether or benzene are used as preliminary cleaning agents, it becomes evident that in scientific analysis these fat solvents should be credited with a share of results.

The history of materia medica suggests the existence of two peculiar "blind" spots in medical science and progress. One, a "lag" period before certain vital discoveries find application. This may be illustrated by penicillin and the sulpha drugs. The second is an insidious and destructive psychology to drugs and compounds that have been found "potent" in small amounts. Ephedrine is typical in this respect; and it is shared by strophanthin, quinidine, prostigmine, pituitrin and adrenalin.

Carbon tetrachloride appears to be under a spell of a toxicity complex.[10] Yet, the equally potent bone marrow poison "benzene" continues to find authoritative sanction for skin use. The related compound chloroform, which can vesicate the skin and produce similar liver necrosis, remains an anesthetic of choice (or necessity), under combat conditions in the tropics.

Admitting the probability of abuse of carbon tetrachloride by the public, the application of the newer knowledge is justified by conditions of urgency as they develop among our armed forces, and, secondly, as a stimulus to further research.

CONCLUSIONS

1. Carbon tetrachloride alone is an efficacious drug in the treatment of dermatophytosis. Its effectiveness appears enhanced by incorporating appropriate volatile oils and metals in combination with an oleate.

2. Carbon tetrachloride is an efficacious remedy for the treatment of smaller heat burns. In combination with an appropriate local anesthetic, it profoundly modifies and hastens the process of healing.

3. A single application of carbon tetrachloride to eposed corium promptly arrests serum oozing without causing evident necrosis or coagulation.

4. Carbon tetrachloride applied promptly to severe small burns has immediately relieved all pain, and prevented subsequent development of vesicles.

5. The accessibility of carbon tetrachloride in fire extinguishers makes possible an effective first-aid treatment in heat burns.

6. Under certain pathologic conditions, carbon tetrachloride exhibits properties of antiseptics and disinfectants. This property, which is shared by other fat solvents, deserves recognition in our theoretical concepts of disinfection and sterilization.

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DISCUSSION

Dr. Clyde Brooks (New Orleans): It would not be profitable for me at this point to enter into the discussion of the mode of action of carbon tetrachloride for the treatment of burns and dermatophytoses. All I wish to do is to open the discussion.

I have seen several cases of burns which have been treated by carbon tetrachloride. I have used it on myself to treat a burn that occurred on my hand. It was quite a painful burn, but not very deep. As soon as I put on the carbon tetrachloride, it eased the pain. I took it off and the pain returned. Several times this was repeated. Finally the pain did not return. I did not put any dressing on it. I expected the burn to form a blister; but it did not. It healed without a blister, and it was very slow about peeling. I have seen other burns treated in which the surface of the arm was burned, a superficial burn but quite severe. After putting on carbon tetrachloride the surface appeared to be dry and not oozing. The application of carbon tetrachloride

itself eases the pain, and it does tend to produce a dry surface and to prevent blisters.

I do not think we expect the treatment of a burn to cure the burn. All we expect is for it not to interfere with the healing process. If it does that it has served its major purpose. It seems to me that is what carbon tetrachloride tends to do.

How many times should you apply the carbon tetrachloride to a burn—just once every hour? What else should you do for these burns? Dr. Fasting has suggested that the ideal treatment of a superficial burn is open air. Anything put on in the way of an ointment or powder, is going to interfere with the healing.

Here is Parker's way of treating burns: Strap it with adhesive and let it stay indefinitely. When the adhesive is removed the burn is healed. I have heard of a New Orleans surgeon who dresses burns with patches of adhesive. Just last week there was an article in the J. A. M. A. in which two Boston surgeons wrote about treating burns by putting on plaster casts. They did not cleanse the burns. They merely clipped off pieces of hanging skin, put on a layer of gauze with petrolatum, fitting it nicely around the fingers, and then a nicely fitting plaster cast, which was left on fourteen days. Then they took off the cast and if the wound was not healed they reapplied it.

I suggest that you try carbon tetrachloride and that you follow that up by putting on a plaster cast. That will possibly complete the treatment. I regard Dr. Fasting's treatment as incomplete. Putting on carbon tetrachloride is not enough. If you can combine carbon tetrachloride with the idea that Dr. Parker used, putting on adhesive, or putting on a plaster cast, you may get a more perfect treatment for burns.

I think we are very much indebted to Dr. Fasting for his stimulating paper.

Dr. D. D. Baker (New Orleans): I have had the opportunity of using carbon tetrachloride with anesthesin and butesin in the treatment of burns. The first striking thing that is noticed is that the pain is almost instantly relieved and seldom recurs. Second, there is usually no blister formation if the burn is treated early enough. By early enough I mean within the first half hour.

I have seen burns from a blow torch which probably would have been rather bad under the usual treatment. These blow torch burns that probably would have produced large blisters and did show marked discoloration caused no blister after carbon tetrachloride treatment.

Carbon tetrachloride is toxic and should be used in a room where there is plenty of ventilation. The vapor is heavy and will fall to the floor. If the room in which the treatment is given is small, a fan should be used to carry the vapor outside.

A dressing is frequently necessary for the protection even though a blister does not occur. This is true especially of an individual with a burn of the volar surfaces of the hands and fingers. It is well to cover the burned regions with an antiseptic powder. I use sulfanilamide powder routinely.

I have not had a chance to use this treatment on large burned regions. Most of my cases have been small burns of the forearm, hand and fingers.

Dr. Fasting (in closing): I realize the difficulty of incorporating details in this paper with a time limit of fifteen minutes. Case reports have purposely been omitted.

Data on 33 minor cases have been collected to date.* While they are not many, it is well to realize that even at a Charity Hospital this type of clinical material does not frequently present itself.

It is hoped that the reading of the publication will produce an attitude favorable to testing extensively the principles involved. The remedy for burns suggested primarily as a first aid treatment in burns is admittedly an innovation. It is well to remember that no efficacious home remedy for burns is known.

The student of medicine is inadequately being taught and impressed with the factor of time in relation to the display of biological phenomena. The absence of vesicle formation suggests the question: Does the prompt application of carbon tetrachloride to burns set in motion or arrest known and unknown physiologic powers? Small burns happen to one's self and one's immediate family often enough and should be observed more closely than hitherto has been the custom. A greater inquisitiveness about the control of forces involved in small burns may after all prove helpful to the problem of large burns. I like to hope that I have contributed in that direction.

If humor is permissible here, allow a last suggestion. Place four or eight ounces of carbon tetrachloride in your bathroom cabinet. Try it for chigger bites after a summer day in the woods or fields. Assuming a fair percentage of physicians to be afflicted with "athlete's foot"—try the remedy when an exacerbation of the ringworm is particularly annoying. The contents may prove useful as a fire extinguisher. It is the dry cleaning agent of choice for gravy spots on ties and vests. Above all make sure there is always some fluid left when accidents cause small burns to members of the family.

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*Subsequent to the reading of this paper, more than one hundred burn cases have been treated in industrial plants. All cases have responded as previously described.

ACUTE VENTRICULAR FAILURE

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To avoid confusion about the subject to be discussed, and to dissipate clashes with various classifications concerning this condition, I should like at the outset to limit this paper to a consideration of acute, congestive heart failure about which the early authorities wrote and which is meant in the great majority of cases when we use the unqualified expression "acute heart failure." I shall attempt to emphasize a few important points about the causes, manifestations, diagnosis and treatment of such heart failure.

The development of myocardial failure may be quite rapid. Though usually slow and insidious, it is recognizable if searched for in the early and often overlooked stages. Unlike the anginal type of failure, this type of failure is never instantaneous. Cardiac enlargement of clinically discernible proportions always precedes such failure and serves as a valuable differential point in that edema and dyspnea, occurring with a heart of normal size, must be ascribed to other causes of congestion than heart muscle failure. The heart muscle may fail first on the left side, or it may begin on the right side; or, more rarely, it may occur on both sides of the heart simultaneously.

The etiologic factors in myocardial failure can best be considered by dividing them into what may be called primary and secondary factors. While one or a few factors usually predominate, the cause may rarely be unknown, or more frequently, unrecognized or multiple.

Drs. Boyer, Leath, and White analyzed, in 1940, the primary and secondary factors responsible for congestive heart failure in 1000 cases, 500 from the wards at the Massachusetts General Hospital and 500 seen in private practice. In their presentation they recognize that their experience will differ somewhat from that of others who live where rheumatic fever is less prevalent and syphilis and anemia more common, or from that of pediatricians where the rheumatic group comprise almost the entirety. In their study, hypertension as an underlying strain, with or without coronary heart disease, topped the list with a total of 47 per cent; rheumatic heart disease was second with 26 per cent; and uncomplicated coronary heart disease—that is, uncomplicated except by myocardial infarction—was third with 16 per cent. No other factor was responsible for as much as 5 per cent. Syphilis, for instance, accounted for but 3 per cent; cor pulmonale, for 2 per cent; and congenital defects, for only 1 per cent. The remaining 4 per cent were ascribed to unknown causes. Males outnumbered females about two to one in the entire group of 1000 cases.

Of even more interest were their findings with respect to precipitating factors superimposed on the underlying causes to set off the failure. Auricular fibrillation led the list of the recognizable complications, being clearly responsible for 14 per cent, doubtless due to the associated tachycardia. Coronary thrombosis, to their surprise, was second, being the exciting factor in 13 per cent. Respiratory infections were third with 11 per cent. Rheumatic fever was the obvious cause in 7 per cent. Pulmonary infarction was the factor in 3 per cent; malignant hypertension, in 2 per cent; exertion, in only 1.5 per cent; anemia, in 1 per cent; and, thyrotoxicosis, in but 0.7 per cent. In a large group of 38 per cent, the onset was very gradual with ill-defined or no precipitating factor, quite likely some very minor strain setting off the failure in the case of the myocardium, whose reserve was nil; in 5 per cent, the onset was very sudden, due also to unknown precipitating factor. In only five cases of the thousand could a surgical operation be blamed for the failure. Pregnancy was the precipitating factor in two patients. Trauma was responsible in two; and excessive ingestion of fluid, in one.

The value of discovering the precipitating factor is obvious and incontestable since these observers found that when failure is precipitated by a removable or controllable cause—such as auricular fi-

brillation, respiratory infection, exertion and thyrotoxicosis—the patient has roughly a fifty-fifty chance of regaining some degree of compensation. This is also true of those patients in whom failure occurred suddenly with no assignable cause, and it seems likely that here, too, some temporary factor was at work. The prognosis they found depended much more on the exciting than on the underlying causes or on the age of the patient, except that those over seventy did poorly. A poor prognosis was always associated with marked cardiac enlargement, regardless of cause. Hypertension, when present, increased the incidence of decompensation in patients with myocardial infarction.

In evaluating the individual case, one must assemble all those particular underling and precipitating factors specifically presented by that case, weigh their importance in their association with the actual structural and organic changes involved and realize the prognostic significance of the exciting cause. To illustrate the extremes: We may consider the rapid failure and death engendered by extensive myocardial infarction complicating hypertensive heart disease; then compare this to a mild rheumatic heart disease withstanding repeated respiratory infection, with little or no evidence of strain. Most cases, however, fall in the middle ground, and all degrees of cardiac failure or enlargement result from corresponding degrees of strain. However, one heart may sustain, without failing, stresses to which another heart may completely succumb.

The signs and symptoms of myocardial failure may best be presented in relation to their mode of development. The great majority of cases of myocardial strain have stress exerted upon the left ventricle. Systemic hypertension, disease of the aortic valve and myocardial infarction first manifest failing response in left ventricular enlargement. When this condition becomes serious enough to permit congestion of the pulmonary vessels, the first symptom appears, consisting of breathlessness on effort or activity which had previously been carried on without breathlessness and for which other explanations do not exist, that is, in the absence of bronchial disease.

I do not intend to suggest that ventricular enlargement and breathlessness occur simultaneously, or even synchronously, since such could hardly be the case. Though ventricular enlargement may precede the symptom of dyspnea by only minutes in the case of a fulminating large myocardial infarction, more frequently the interval is much longer—even extending to years, as in the instance of slowly progressive hypertension or in aortic stenosis. However, as White emphasizes, enlargement must always be present due to dilatation, or to dilatation and hypertrophy, before dyspnea can justifiably be blamed on heart failure. In fact, the extra-cardiac causes of dyspnea exceed in number the cardiac; and, actually, the mere presence of cardiac disease coexistent with dyspnea need not imply that the latter is a result of cardiac failure. The picture is complicated further by the fact that respiratory disease may precipitate heart failure, especially when heart disease is already present. Specificity of importance in etiology of dyspnea in such a circumstance would require considerable skill and care. The use of venous pressure determination and estimation of the circulation time is simple and of great importance in doubtful cases—the former, of course, only being altered when the right ventricle is affected.

Vieussens, more than two hundred years ago, called attention to the necessity of differentiating the dyspnea resulting from mitral stenosis from that due to left ventricular strain, since they differ in pathogenesis, prognosis, and treatment. As he showed, the dyspnea in mitral stenosis is not to be attributed to heart muscle failure —though it often leads to it, but then of the right ventricle and not of the left. A patient with mitral stenosis may be doing quite well for years, then suddenly become dyspneic as a result of onset of auricular fibrillation developing so frequently to complicate mitral stenosis.

In such case, it is the tachycardia de-

creasing the effective work of the heart which congests the lungs with blood and increases pressure in the pulmonary artery to such an extent that the right ventricle frequently begins to fail. In realizing the principle of causation of dyspnea here, the error of ascribing such dyspnea to failure of the myocardium is obvious, and the fact that failure does so frequently eventuate explains why this error is so often made. True enough, the heart is at fault in causing the dyspnea, but it is at fault because the myocardium per se is at fault. The multiplicity of action of digitalis prevents great harm resulting from such an error because as the drug par excellence for congestive heart failure it also helps tremendously in these cases by producing heart block, reducing the heart rate, and so relieving the pressure in the pulmonary circulation and relieving the strain on the right ventricle.

The emphysema and "cardiac asthma" seen in cardiac patients may be traced to the breathlessness on effort mentioned as the primary symptom, which, without treatment, usually tends to increase in severity until it is present even at rest, passing through stages of added intensity until emphysema develops in a futile attempt at compensation; and, as Hope described, "cardiac asthma" appears as a super-added reflex phenomena in some but by no means all cases of left ventricular failure. The raising of copious quantities of blood even in the most acute cases almost invariably can be credited to pulmonary infarction or infection; small amounts of blood, usually consisting of slight "streaking," may occur simply from acute pulmonary congestion, however.

The fact that breathlessness antedates the appearance of physical signs of heart disease (other than cardiac enlargement) makes its evaluation doubly important. When the physical signs do appear, much valuable time has been lost in waiting as the condition is less responsive to therapy. White lists accentuation of the pulmonary second sound, in hypertensives often equalling or surpassing the already accentuated aortic second sound, diminution of the first sound, and protodiastolic gallop rhythm at the apex (a gallop seen or felt even better than heard.) Mitral valve dilatation or physical insufficiency may produce a mitral systolic murmur. It is interesting to note that old murmurs, especially that of aortic stenosis, may be diminished markedly. Pulsus alternans is fairly common in left ventricular strain and can be shown readily by auscultating the brachial artery with the blood pressure cuff at slightly below the systolic pressure, then lowering the pressure until the alternate beats appear.

Fluoroscopic examination aids greatly not only in accurately determining the size of the heart, but is productive of more specific finding in the later stages showing dilatation of the pulmonary artery and its branches and severe degrees of pulmonary edema. The important complication of pulmonary infarction may be revealed, though this is more frequently an accompaniment of right heart failure. Incidentally, as Paul White states, rales at the lung bases are an advanced sign of pulmonary edema and are much more often due to pulmonary infection, to unilateral or bilateral infarction, or even to atelectasis.

Cyanosis is a sign of little value in determining which side of the heart is failing; since, though it occurs with marked left ventricular failure, it occurs also in right ventricular failure, due to stasis. In fact, it may occur in simple mitral stenosis in the absence of myocardial failure, due to pulmonary congestion. A defect in the local pulmonary circulation with resultant local venous stasis can also be responsible for cyanosis. We must remember that congestive heart failure, except in its terminal stages, may be present with no cyanosis at all.

Failure of the right ventricle may occur primarily as a result of mitral stenosis or pulmonary vascular disease in the absence of left ventricular failure, but most often the right ventricle fails as part of a cycle of failure inaugurated by failure of the left ventricle. The first sign to be sought for in detecting right ventricular failure is en-

gorgement of the liver. A great deal of hepatic engorgement can occur before appreciable elevation of venous pressure is produced, even when manometric determinations are made, much less to the gross evidence of distention of the neck veins. White and Boyer have found, for example, that "a very early symptom of right ventricular insufficiency in mitral stenosis is right upper quadrant abdominal pain on effort, due doubtless to acute hepatic engorgement, comparable to the acute pulmonary engorgement which causes dyspnea on effort relatively early in the case of left ventricular insufficiency."

The liver, rather than the systemic veins, quite naturally bears the brunt of right ventricular failure because of the low pressure in both the portal and hepatic circulations, because of the effect of gravity and because of the angularity of the entrance of the hepatic veins into the inferior vena cava. A condition of acute or subacute engorgement of the liver may commonly last for as long as several weeks and, as such, can be readily recognized by the discovery of hepatic enlargement or right upper quadrant tenderness co-existent with severe rheumatic carditis in childhood or in any patient with serious stress of the right ventricle. Such a condition may go on to a permanent or constant state of congestion lasting for years, or it may subside entirely. Mitral stenosis and constrictive pericarditis are the conditions in which such chronic enlargement most often occurs, and this often eventuates in the picture of what is justifiably called cardiac cirrhosis, differentiated—often with difficulty—from Laennec's cirrhosis. It has been theorized than an hepatic involvement consisting of acute rheumatic hepatitis exists, but the whole picture can be satisfactorily explained without this unproved conception.

Any evaluation of the liver in relation to heart failure must consider several manifestations other than mere alteration in size and consistency. It has been previously thought that active liver pulsation indicated stenosis of the tricuspid valve, but it has been definitely shown that such is not the case necessarily. Of course, tricuspid valve disease with regurgitation may be accompanied by pulsation of the liver; but, when such pulsation is vigorous, it must be due to tricuspid regurgitation, whether or not the valve itself is primarily diseased. In fact, even following recovery from congestive heart failure, an irreversible dilatation of the tricuspid ring, with little or no valvular deformity, may persist, particularly in cases of severe mitral stenosis. Such a situation is evidenced by strong systolic pulsation of the jugular veins. As MacKenzie has shown, the liver may pulsate even in the presence of cardiac arrhythmia; although in the presence of the most likely arrhythmia—namely, auricular fibrillation—the liver pulsation is a single wave, or as he called it, the ventricular type of wave. There is little doubt that in many cases the liver pulsates, but so weakly that it cannot be often recognized.

The appearance of jaundice in a patient with the picture of congestive heart failure often arouses anxiety as to the proper functioning of the biliary tract, when actually the icterus is due to the superimposition of a pulmonary infarct and the inability of the congested liver to handle properly the hemolyzed blood pigment from the infarct. As a prognostic indicator, such jaundice, if severe, is of unfavorable import.

Venous pressure measurements are rapidly assuming a widespread and rightful position in the armamentarium of the clinician; and elevation of the venous pressure is of great value as a sign of right ventricular failure, no matter what the cause. Dilatation or pulsation of the jugulars develops, but much later than recordable variation in the measured venous pressure. A large pulse pressure of sometimes several centimeters occasionally occurs. Such a pulse is best recorded with the patient upright, since the recumbent position increases the venous pressure and makes the pulsation less evident. A point which often causes confusion is the differentiation between jugular pulsation and carotid pulsation. As White has shown, this error can

be avoided "by observing the sustained character of the venous (c plus waves) in contrast to the arterial pulse, and by its easy obliteration by relatively light pressure over the jugular bulb."

Edema of the dependent parts gives another evidence of failure of the right ventricle. Frequently complicating factors—such as, hypoproteinemia or local circulatory defects (as varicose veins)—exist; but the hydrostatic effect usually causes the edema to be more pronounced at least in the dependent parts whether they be feet and legs, back (especially over the sacrum), abdominal wall, chest, arm, or even side of the face. Often the degree of edema is not commensurate with the degree of myocardial failure and in such cases one of the complicating conditions may be the predominant controlling factor. Of course, we must remember that such extra-cardiac defects are quite capable of causing tremendous edema in the absence of heart disease; and, too often patients are seen who have had such non-cardiac edema treated for long periods by digitalis.

As in the left ventricular failure, a gallop rhythm also develops with failure of the right ventricle; but, in the latter, the arrhythmia is more notable just to the left of the manubrium, whereas in failure of the left ventricle, it is more pronounced at the apex.

Another result of congestion developing in right-sided heart failure is hydrothorax which early is almost always right-sided, though later it may be bilateral. In fact, left hydrothorax should suggest some other causation such as infection. Such extra cardiac factors should, of course, also be considered in right hydrothorax as well.

The importance of the x-ray as a diagnostic aid in heart disease has already been emphasized in the discussion of failure of the left ventricle. The findings in right heart failure are likewise helpful; here again the heart is always enlarged, often becoming smaller as compensation is restored, and the superior vena cava may be bulging and pulsation may be seen. However, since failure of the right ventricle manifests congestion of the systemic circulation, the x-ray findings are by no means as potent an aid as they are in left ventricular failure where the revelation of pulmonary congestion often is a deciding point of evidence.

Circulation time is a valuable diagnostic aid in doubtful cases, but its importance is mainly relative to the left ventricle; namely, in differentiating cardiac dyspnea from bronchial asthma or other non-cardiac causes of dyspnea. Congestive heart failure shows increased circulation time in all of the tests.

The electrocardiograph is of little aid in the diagnosis of heart failure, except in giving insight into the primary etiology and in showing upon which ventricle the strain had fallen in the preceding period. Often electrocardiographic studies are needed in evaluating digitalis effects, but in most cases this can be readily determined clinically.

Another aid which is sometimes employed is the use of vital capacity determinations. It is obvious that such a procedure could be open to great individual variation and error, and its application is of little value except perhaps in following the progress of a patient.

The aid of the laboratory may be invoked for blood and urine studies. As previously mentioned, a hypoproteinemia may exist, with or without nephrosis, and with or without heart disease. Leukocyte studies and determination of the sedimentation rate are of value in ruling out the presence of infection. Erythrocyte count, hemoglobin, and hematocrit studies may reveal an anemia as a complicating or even a causative factor in heart disease.

PROGNOSIS OF CONGESTIVE HEART FAILURE

The outlook in such a picture is, of course, both for the immediate and the future, relative to the etiology. If the episode has been precipitated by a removable factor—such as, the excessive tachycardia of auricular fibrillation—the immediate prognosis is improved; but, if the episode is but one of many such or if it was spontaneously

or easily precipitated, the future outlook is very poor, and with each succeeding attack both the immediate and future prognosis is made poorer. However, though we may not be able to cure the patient, we can in most cases prolong life appreciably. The length of time and the ease with which a patient with mitral stenosis or chronic adhesive pericarditis may carry on his activities is often surprising. This fact is another feature of the importance of differentiating between the pulmonary congestion caused by these two conditions and from myocardial failure where the prognosis is very much worse. For congestive failure, the rule that "the larger the heart, the worse the future" generally applies.

TREATMENT OF ACUTE CIRCULATORY FAILURE

The preceding pages have dealt primarily with the diagnostic side of myocardial failure and rightly so since, although giving aid to the patient is our fundamental aim, proper diagnosis and evaluation is essential before treatment may be intelligently administered. Though most myocardial failure is gradual in its development, many cases are seen in which the failure is acute, and to meet such emergency a well-planned outline of treatment should be formulated. The fact that circulatory failure is a complex disorder as a rule is unfortunate, and to avoid errors a few simple criteria may be helpful. Acute circulatory failure may be of central or peripheral origin. In the central type—about which this paper is concerned—the cardiac mechanism is at fault. The other main type, peripheral circulatory failure or shock, occurs in the presence of competent heart function but is a result of defective peripheral circulation and inadequate return of blood to the heart. Treatment directed at the heart in this latter case would obviously be of no value, and the primary consideration is maintaining blood volume. In the former type, central failure, an entirely different therapeutic approach is needed wherein so-called cardiac drugs play a vital role.

Before continuing with a consideration of the treatment of congestive heart failure, it seems advisable to summarize the picture in this condition and condense the more important features into less bulky form.

Hypertrophy and dilatation is the natural reaction for a heart in its attempt to compensate for the stresses put upon it by a constant, long-continued excess mechanical burden. For a time, the attempt at compensation is successful, and the work of the heart is successfully carried on so the patient is free of symptoms and thus ignorant of the impending danger. Finally, however, the compensation becomes inadequate and breathlessness on exertion appears. Soon after, edema of varying degrees is seen in the dependent parts of the body; then, the failing heart is subjected to some added stress, perhaps a respiratory infection, prolonged tachycardia or overexertion, and a sudden attack of pulmonary edema may be precipitated. Such a patient is usually seen sitting erect, fighting for his breath, and terrorized because of his feeling of suffocation, also often further encumbered by a hacking cough. The perspiration is profuse; the superficial veins are engorged and distended. With increasing severity of the edema of the lungs, a frothy, blood-tinged sputum may be coughed or spontaneously emitted from mouth or nostrils. In a situation as this one, immediate attention and a well-habituated therapeutic approach are essential if life is to be preserved.

Rest, sedation, digitalis, oxygen and diuretics are our most potent weapons in combating acute cardiac emergencies, and each of these plus the other important considerations will be discussed individually.

REST

By the time these patients are seen by a physician, they are in a state of utter exhaustion, both physically and mentally. They have already expended their meager physical strength in the frantic attempt to breathe; and, in some cases, in trying to care for their needs or get to a hospital or physician's office, the exertion has completely fatigued them. The anxiety accompanying such a state is severe and powerful in producing exhaustion. This anxiety

must be relieved by the physician's comforting and convincing reassurance. The extreme upright position, achieved by having the patient sit in a chair with head and arms resting on a table in front of him, is usually most comfortable and satisfactory. In the hospital the head should be raised to the limit, or in the ordinary bed a chair may be placed horizontally under mattress or pillows. By supplying constant and careful nursing, the patient is assured of every care, and that he should not exert himself in any way should be impressed upon him. Caring for the bodily needs of feeding, bathing, and using the bedpan should be carried out with the least possible disturbance. The patient's room should be well-ventilated with a constant influx of fresh air.

SEDATIVE DRUGS

In the treatment of congestive heart failure, only digitalis can challenge morphine in value or importance. Morphine (or a comparable opium derivative) should be given immediately, and the effects may be startlingly satisfactory. Apprehension and restlessness are abated, the exhausting struggle for breath is eased and more effective respiration takes its place, and often an invaluable sleep is abetted. The objection that the use of morphine in such cases may precipitate Cheyne-Stokes respiration or make respiration more irregular is perhaps just; but, in many cases it is possible to correct this condition should it be presented.

For patients in whom congestive heart failure is a semi-chronic state, the use of morphine may be criticized; but each individual problem, with its psychologic and philosophic aspects, must be considered singly. However, morphine should be given less frequently and in smaller dosage as improvement occurs; and, when morphine is no longer essential, the less potent drugs such as codeine may be substituted. The barbiturates or bromide may be used in this stage. But in the acute stage, one should not experiment with sedatives—morphine is unequalled then. Later, as long as sleep and rest are secured, the choice of sedative drugs is wide.

DIGITALIS

In congestive heart failure, digitalis is our most powerful and effective method of attack; and, when congestive failure occurs in the presence of adequate digitalization, the therapeutic attack feels the weakness greatly. Digitalis is almost universally used, but the frequency of its misuse is as great as that of its proper use. The fact that it is so essential in treating congestive heart failure lends emphasis to the need that its proper use be understood, and in order that such may exist an understanding of the actions of this drug is important.

MODE OF ACTION

No pretense is made to attempt to cover the myriad of actual or theorized actions of digitalis. Only a brief summary of the more clinically relative actions is undertaken. In congestive heart failure, one of the more important actions is the lengthening of the refractory period and depressing or slowing auriculo-ventricular conduction. The control of the tachycardia and irregular rhythm of auricular fibrillation by digitalis depends upon this action. The direct effect of digitalis on the myocardium is of great importance, especially in the presence of relatively normal rate and rhythm. It increased the tone of the heart muscle and the contractility of the muscle fibers, thus aiding the dilated, decompensating heart. Another though less important action is its direct action upon the sino-auricular and the auriculo-ventricular nodes. This consists of depression of these nodes (increased vagal effect) and thus effects slowing of the heart rate.

MODE OF ADMINISTRATION

The most extreme difficulty experienced in the use of digitalis is in determining the proper dosage for the individual patient. Digitalis is well-known to be a potent poison, and like all poisons is capable of making the patient uncomfortable or even causing fatal results if pushed beyond the well-recognized toxic effects. On the other hand, just as frequently, too little of the

drug is administered and here, too, the patient suffers. The powdered leaf is generally more satisfactory than other preparations because of its stability and because with its use the dosage can be more efficiently controlled. The standardization has been recently changed, and the physician should familiarize himself with the potency of an accredited product and use it exclusively. Obviously, in the majority of cases, the optimum route of administration is by mouth. Absorption is complete, satisfactory; and, except for rare idiosyncrasy, there is no local gastric irritation and nausea is a manifestation of toxicity. Nausea and vomiting may be produced from splanchnic congestion resulting from the congestive heart failure, and in such a case a parenteral route should be used to avoid risk of poor absorption or loss through vomiting. Likewise, in acute congestive failure, the parenteral route is employed because of the greater rapidity of effect. In extreme cases, the drug may be injected intravenously.

DOSAGE

Formulae have been devised, as guides in the use of digitalis, by prolonged and painstaking clinical investigation under carefully controlled conditions. But these are not meant to serve as an exact routine in the treatment of acute congestive failure; rather they are meant to be used as a rough guide with observation of the patient as the final criterion of dosage. The figures usually accepted as a digitalizing dose for the average adult vary from 1.5 to 2.0 grams (22 to 30 grains) of powdered digitalis leaf. One may give 0.1 gram (1½ grains) of digitalis leaf for every 10 pounds of body weight (making proper deduction for edema) as a general rule. Before undertaking any digitalis therapy, one must ascertain whether or not the patient has previously received digitalis. The heart failure may actually be due to over-dosage of digitalis, and in such case the indiscriminate use of digitalis or any of its group of related drugs is contraindicated and might perhaps be fatal.

The severity of the patient's condition is the index deciding the urgency of speed of digitalization. A frequently satisfactory method consists of giving one-half the total estimated digitalizing dose in divided amounts during the first twelve hours. The second half of the dose should be given in smaller doses at greater intervals, controlled by careful vigil for signs of toxicity. This second half may, for instance, be given as 0.1 gram (1½ grain) every four hours until toxic effects or symptoms appear, which, upon occurrence, signify the need for withholding the drug for about 24 hours after which a tentative maintenance dose may be started. Diuresis or relief of dyspnea are gratifying effects of digitalization. Nausea, vomiting, increase or onset of premature contractions herald the more serious toxic effects. Often the maximum therapeutic effects lie very close to the minimum toxic effect. To maintain a patient adequately digitalized, we must replace the amount of the drug excreted daily. This amount varies, but a tentative dose of 0.1 gram (1½ grain) daily may be instituted under observation to discover the individual reaction or variation.

When the severity of the acute congestive failure makes more rapid relief essential, a plan such as the following may be carried out: One may give 0.5 (7½ grains) of powdered leaf in 15 c.c. of sterile water injected intravenously; or a commercial preparation of equal potency may be similarly used. Strophanthin, or its crystalline alkaloid, ouabain, may be used if the patient has not previously received digitalis. If this is used, doses of 0.25 to 0.5 mg. may be used, following which complete digitalization or maintenance can be carried out with powdered digitalis leaf orally.

OXYGEN

The use of oxygen is coming ever more into its own in the treatment of congestive failure. Dramatic relief from restlessness and tachypnea may often be seen following the institution of oxygen inhalation. The patient may need reassurance when told that he is to be given oxygen for it often seems that "oxygen tent" is associated with a grave outlook to the average patient. On

finding how greatly his breathing is eased, however, his anxiety is quieted and often sleep quickly ensues. Oxygen may be given by tent, mask, or nasal catheter—the latter being simple and economical though perhaps uncomfortable for some. No definite rule governing the flow may be set down; however, six liters per minute is frequently satisfactory.

DIURETICS

There is a great difference of opinion about even the advisability of using diuretics in acute congestive heart failure; some people believing that the circulation already embarrassed should not be further overburdened by the added work of removing edema fluid. However, this argument at least does not hold when applied to those diuretics acting upon the kidney and decreasing the volume of circulating fluid in the vascular system. It is true that the matter of systemic edema is hardly a major problem in the treatment of acute congestive failure; but pulmonary congestion or edema is a very important one, and the use of potent diuretics may be of some benefit in relieving this problem. The removal of tissue edema fluid may enable the heart to recover enough perhaps to postpone recurrences of acute heart failure.

We cannot expect diuretics to remove large collections of fluid from the pleural or peritoneal spaces. For this purpose, paracentesis is the proper procedure, often giving the patient tremendous relief and making respiration much easier, deeper, slower and more effective. Happily, diuresis often follows paracentesis, resulting in diminution of peripheral or dependent tissue edema.

Perhaps the most effectual of the diuretics is that of the mercurial group, of which mercupurin is a very satisfactory member. It may be given intravenously in doses of 1 to 2 c.c. of 10 per cent solution, or intramuscularly in the same dosage. It should not be repeated within less than four days, and it may be used repeatedly for fairly long periods of time though tolerance eventually develops in many cases. Novasural and salyrgan in the same dosage are satisfactory preparations of mercurial diuretics and are widely used. When given intravenously, care must be exercised to prevent any of these drugs from escaping into the subcutaneous tissues, since in such a case a large slough may be produced. If the intramuscular route is chosen, the gluteal region is the site of election and the needle should be deeply inserted. The effect of mercurial diuretics is said to be enhanced by the previous or coincident administration of 1 to 1.5 grams of ammonium chloride four times daily.

The xanthine diuretics are sometimes effective and are frequently used. Theobromine and aminophyllin are the two most widely used of this group and are sometimes given in doses of 0.25 to 0.50 gram three times a day. These drugs often produce nausea and vomiting, however, and may give the false impression of digitalis intoxication. Aminophyllin is of special value in cases of cardiac asthma or in Cheyne-Stokes respiration, in both of which it is best given intravenously in dosage of 0.50 gram in 20 c.c. of sterile water, injected slowly. Xanthine diuretics should not be used continuously over long periods of time.

VENESECTION

The prime indication for venesection is acute pulmonary edema, where it then may give dramatic and life-saving results. The blood (500-700 c.c.) should be removed rapidly since in pulmonary edema, minutes count. If the flow is not fast enough through an 18 gauge needle, a phlebotomy should unhesitatingly be done. Even in ordinary congestive heart failure, the removal of a large amount of blood may give the failing heart just the respite it needs to make the difference between recovery and progressive failure.

The so-called "bloodless venesection" is often of some value and consists of tourniquets applied to extremities in order to decrease the venous return to the heart. By leaving one extremity at a time free, and rotating the tourniquets, this procedure can be prolonged for quite long periods.

DIET

During an episode of acute congestive failure, the diet is not a major consideration since the patient is too ill to desire nourishment and his caloric need is at a low level. Frequent small amounts of cracked ice or orange juice relieve the dryness of the lips and mouth which has resulted from the dyspnea and mouth-breathing. When the acute danger is over and the patient begins to recover, the Karrell diet is very satisfactory and is extensively used. It consist of 200 c.c. of skimmed milk four times daily. As recovery progresses, fruit juice may be substituted, and gradually small amounts of semi-solid, then solid food may be added. While edema persists, the diet should be low in salt or salt-free, and the total daily intake of fluid should be limited to one and one-half liters per day.

MISCELLANEOUS

Adrenalin and other vaso-pressor drugs have no place in the treatment of congestive heart failure except in the presence of ventricular standstill, where it may then be boldly injected directly into the heart chamber. Caffeine, coramine and cardiazol likewise are not indicated unless a need for respiratory stimlation becomes evident. Some claim that squill glucoside or urginin (having digitalis-like action) are sometimes effective in the rare cases where an intolerance to digitalis exists.

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A SYMPOSIUM ON THE USES OF SULFONAMIDES*

THE SULFONAMIDES IN INTERNAL MEDICINE

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NEW ORLEANS

Ever since Foerster[1] in 1933, and Domagh[2] in 1935, first demonstrated that the sulfonamide drugs could protect mice from otherwise fatal infection with hemolytic streptococci, experimental and clinical data on their use have been accumulating. The indications for their administration and the limitations of their clinical effectiveness in medical diseases are now well recognized, and the literature on the subject is so extensive as to make impractical any detailed consideration of it within the scope of this paper, which will necessarily be limited to the use of the sulfonamides in clinical medicine.

Some idea of the widespread use of these drugs can be gained from the fact that in 1941 approximately 1,750,000 pounds of sulfapyridine, approximately 1,200,000 pounds of sulfanilamide, and between 1,000,000 and 1,500,000 pounds of sulfathiazole were produced in this country.[2] It is a reasonable assumption that during the same period between 10,000,000 and 15,000,000 persons were given these drugs.

GENERAL CONSIDERATIONS

In general, the so-called pyogenic bacteria have been found to be most susceptible to the influence of the sulfonamides, and the mechanism of their chemical action has been the subject of intense interest and considerable conjecture. In brief, it may be stated that these drugs are quite similar in chemical structure to certain essential substances (such as p-aminobenzoic acid or a like substance) required by the bacteria for their normal metabolism and growth. Their action is apparently purely bacteriostatic. The organisms, seemingly unable to distinguish between the sulfonamides and the substances needed for their growth, are subjected to the influence of the drugs. Being deprived of essential p-aminobenzoic acid or similar substances, they cannot either grow or multiply, they simply die. The process of bacterial destruction is probably accelerated by the mechanism of immunity of the animal body.

This theory is often used to explain the well established observation that the clinical effectiveness of the sulfonamides is greatest when they are given early in the disease process, before the causative bacteria have had time to build up and accumulate any great store of essential nutritive substances. An impressive example of this

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fact was given by Flippin and his group:[4] In 1,635 cases of pneumococcic pneumonia, the mortality was 3.3 per cent in 451 patients adequately treated with the sulfonamides within the first 48 hours of the illness, as compared with a mortality of 17.9 per cent in 633 patients whose treatment was begun after 96 hours. The incidence of complications and the morbidity are both greater in the patients in whom treatment is started relatively late in the course of the disease.

DOSAGE AND ROUTE OF ADMINISTRATION

In general, except when used in certain enteric diseases, the maximum therapeutic efficiency of the sulfonamide drugs is accomplished by administering them in such a manner as to obtain the most rapid and most effective blood level. A blood concentration between 5 and 10 mg. per cent is satisfactory in the average case. It is not possible to substantiate the theory that blood levels of 30 to 50 mg. per cent are more effective therapeutically than are the lower levels, and there is little if any evidence to support the idea that in mildly ill patients the dosage should be small, while in severely ill patients it should be large. When one considers that toxic reactions are more frequent with the larger doses, the idea that the higher blood levels are without danger may be critically questioned.

In the average case, as a routine procedure, the oral route of administration is entirely satisfactory. An initial dose of 4 to 6 gm. of the preferred preparation is followed by subsequent 1 gm. doses every four to six hours until the total dosage has been given. The intravenous administration of the sodium salts is advantageous only in gravely ill patients, in whom the oral route is impractical because of vomiting, inability to swallow, and other reasons, or in whom an effective concentration in the blood stream is desirable within 15 to 30 minutes. The sodium salts may also be satisfactorily administered by hypodermoclysis in isotonic salt solution,[5] the average concentration being 5 gm. per 1,000 c. c. of fluid. Intraspinal administration, formerly regarded as advantageous in cerebrospinal fever and pneumococcic meningitis, has been generally discontinued as useless and probably harmful.

Clinically, the sulfonamide drugs, if given in adequate doses, exert their maximum effect within a short period of time. In the absence of complications it is only occasionally necessary to continue their administration beyond six days. Fortunately, the majority of toxic reactions do not occur until after this time. It would be well for all of us to heed the often-repeated warning that when the sulfonamides, in adequate dosage as determined by satisfactory blood levels, have no beneficial therapeutic effect within the first 60 to 90 hours, their use should be discontinued. This plan should be the rule unless there is some definite reason for their further trial, in spite of the risk of toxic reactions.

PNEUMONIA

There is no longer any question as to the therapeutic benefit of the sulfonamides in pneumonia caused by the pneumococcus, the staphylococcus, the streptococcus, and perhaps *B. mucosus capsulatus* or *H. influenzae*. On the other hand, in pneumonia due to organisms other than this so-called sulfonamide-affected group there is little evidence that they are of any value, and the resulting toxic reactions may prove harmful. This is notably true of the relatively widespread and apparently increasingly frequent entity variously called "atypical pneumonia," "influenzal pneumonitis," "acute diffuse bronchiolitis," "acute interstitial pneumonitis," or, more popularly, "virus type pneumonia." The clinical manifestations and the severity of this entity differ, but the absence of significant bacteria is a common characteristic, and for the present, treatment remains symptomatic.

Even at the risk of seeming repetitious, let me emphasize again the limitations of the sulfonamides in pneumonia. They are not agents to be used to the exclusion of recognized and proved supportive therapy. They are not substitutes for such therapy. They are supplemental to it.

It is good practice in all cases of pneumonia to institute chemotherapy at once, while the specific offending organism is being determined. When the causative organism is properly identified, chemotherapy may be continued or discontinued, according to the findings. If the administration has been unnecessary, no harm will have been done, since toxic reactions are seldom manifest in the first few days. Bacteriologic information is of special value in the cases in which no response to chemotherapy is observed within 24 to 36 hours, since specific serum is frequently useful under these circumstances.

Sulfadiazine is now widely used in pneumonia, almost to the exclusion of the other compounds formerly in favor.

MENINGITIS

The advent of the sulfonamides has dramatically affected the mortality rate of penumococcal meningitis and cerebrospinal fever (meningococcic meningitis). Hodes, Smith and Ickes[6] recently reported a series of 60 cases of pneumococcic meningitis with a recovery rate of 44 per cent. At the New Orleans Charity Hospital the former mortality of approximately 65 per cent in cerebrospinal fever has been reduced to less than 1 per cent.[7]

Sulfadiazine, because of its low toxicity, is the drug of choice for routine use, being equally as effective as sulfapyridine and sulfathiazole. Oral administration is apparently as effective as the intravenous route, though it is still of value in the occasional comatose or critically ill patient. Intraspinal therapy has been shown to possess no advantages whatsoever and to be distinctly harmful.[8] Lumbar puncture should be done only for diagnostic purposes. Specific antitoxin may be used in conjunction with the sulfonamides if desired, though the general opinion is that it is not necessary.

Hodes and his associates, who advocate this general plan of treatment in pneumococcal meningitis emphasize that surgical drainage of the focus of infection is best delayed until the meningitic infection is controlled and the patient's condition has improved under conservative therapy.

ACUTE BACILLARY DYSENTERY

The results of the sulfaguanidine therapy in acute bacillary dysentery has been uniformly favorable.[9] The basis of its therapeutic effectiveness lies in the fact that since the drug is poorly absorbed, its bacteriostatic effect is both concentrated and prolonged at the site of the invading organism.

Succinyl-sulfathiazole seems to possess even greater advantages in acute bacillary dysentery than sulfaguanidine. Smyth and his associates[10] have shown that it is of low toxicity and that it has a striking bacteriostatic action not only against the usual intestinal flora of man but also against the Shiga, Sonne and Flexnor strains of dysentery bacilli in both the acute disease and the carrier stage. The average adult dosage is 15 to 20 gm. (0.25 gm. per kg. of body weight) initially used for three or four days in obstinate cases. Some 5 per cent of the drug is absorbed and is excreted by the kideys. Toxic reactions, especially when larger doses have been given and repeated, have been reported, and are similar to the reactions caused by other sulfonamides.

DISEASES CAUSED BY NON-SULFONAMIDE-AFFECTED ORGANISMS

Sulfonamide therapy is justified tentatively in adequate doses, for periods of five or six days, in such diseases as typhoid fever, undulant fever, and tularemia, though the results have not been consistently good. No beneficial effect has been noted in pulmonary tuberculosis, although good results have been reported in the treatment of secondarily infected tuberculous sinuses. Active bacterial endocarditis and rheumatic fever are not influenced by sulfonamide therapy.

SULFONAMIDE-FASTNESS

It has been demonstrated in vitro that certain bacteria may acquire a tolerance or resistance to one or more of the sulfonamide compounds. The same phenomenon may be observed clinically, as the result of

unsuccessful chemotherapy.[11] Recently it has also been shown[12] that staphylococci which have become sulfonamide-fast have acquired the power to accumulate large amounts of the p-aminobenzoic acid which is essential for their growth but which definitely inhibits sulfonamide effectiveness. The use of urea will overcome the resistance of sulfonamide-fast staphylococci to sulfonamides. The final outcome of this phase of the problem as regards other organisms is awaited with considerable interest.

TOXIC REACTIONS

The sulfonamides, like other chemotherapeutic agents, are capable of initiating toxic reactions varying from mild to very serious. In the former group are such reactions as headaches, nausea, vomiting, and various rashes. In the latter are such reactions as agranulocytosis, acute hemolytic anemia, aplastic anemia, purpura hemorrhagica, thrombocytopenic purpura, urinary concretions, acute nephrosis, azotemia, dermatitis exfoliativa, pulmonary edema, hyperpyrexia, convulsions, psychoses, persistent cerebral damage, and acute hepatic degeneration.[13] Toxic reactions are most likely to occur after the fifth day of administration, and are particularly frequent in persons previously sensitized to the sulfonamides as long as three months ago. The severe type of reaction is most frequent when large doses of the drug have been given, especially over a long period of time.

The best safeguard against renal complications is obviously a fluid intake sufficient to insure a daily urinary output of at least 1,500 c. c. Alkalinization of the urine is a further precaution against crystalluria and the formation of renal calculi. The administration of urea[14] is an additional prophylactic measure but seems hardly necessary if fluids and alkalis are given in adequate amounts.

The following cases are presented merely to illustrate briefly two different types of toxic reactions in bacterial infections resistant to sulfonamide therapy:

CASE NO. 1

A. M., a white male 25 years of age, was admitted to the Hotel Dieu service of Dr. Chetta, December 18, 1942, complaining of an ulcer on the right hand and moderate fever of 12 days'

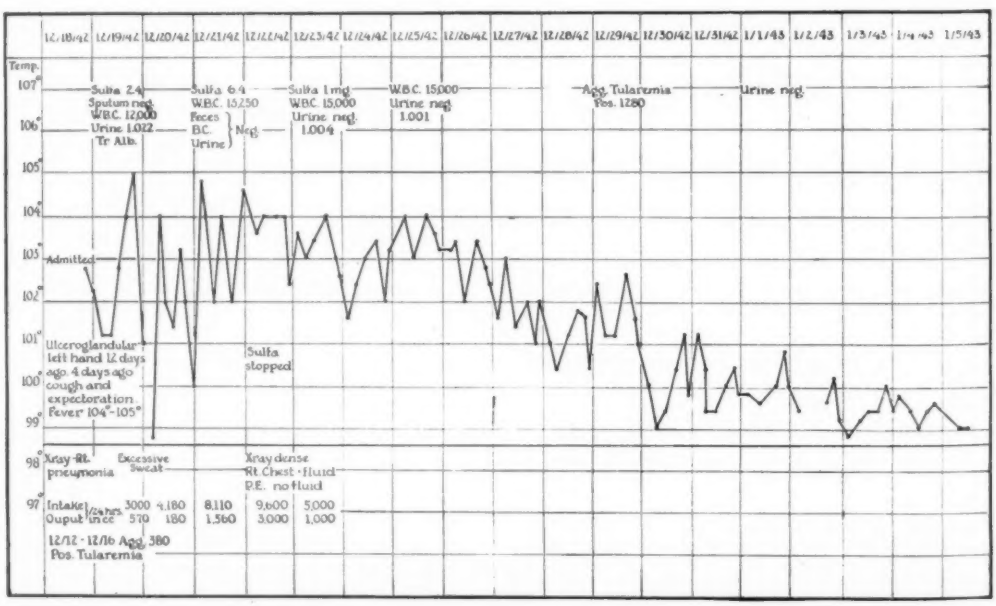

Chart I. Case of pneumonia showing toxic reaction from sulfathiazole and without demonstrable effect.

duration. Four days before admission he had developed a productive cough and physical signs of pneumonia on the right side; at the same time the fever rose to 104° to 105° F. Questioning revealed that on several occasions in the weeks before the onset of his illness the patient had cleaned wild rabbits, and on the sixth and tenth day of the illness blood serum agglutinations for tularemia organisms revealed positive reactions in 1:380 dilutions.

The blood count showed a moderate leukocytosis but urinalysis, blood culture, and examination of the sputum and feces revealed no abnormalities. Roentgenologic examination of the chest revealed consolidation of the entire right lung, most marked in the central region.

Oral sulfathiazole therapy had been begun on the fifth day of the illness and was continued for twelve days. The sulfathiazole level of the blood when the patient was hospitalized was 2.4 mg. per cent and on the twelfth day of administration was 6.4 mg. per cent. The patient, however, showed no improvement. The pneumonic process was progressive, toxemia was marked, and sweating was extreme. Despite a daily intake of 3,000 c.c., 4,180 c.c., 8,110 c.c., and 9,600 c.c., of fluid, the daily urinary output was respectively 570 c.c., 180 c.c., 1,560 c.c., and 3,000 c.c.

Finally, as already stated, chemotherapy was terminated on the twelfth day of administration and only symptomatic therapy continued. The urinary output increased and the excessive sweating decreased, as did the toxemia. On the fifth day after the drug had been discontinued the fever began to subside. Blood serum agglutination tests at this time were positive in a dilution of 1:1,280.

Sulfathiazole had no demonstrable effect on this patient's infection in the twelve days during which it was administered, though the toxic reaction obviously added considerably to the seriousness of the primary disease process.

CASE NO. 2

H. L., a white male 54 years of age, was admitted to Hotel Dieu, December 1, 1942, complaining of fever, severe headache and a productive cough of eight days' duration. His condition had become progressively worse, and when he was hospitalized there were physical signs of pneumonia in the left side posteriorly and his temperature was 103.5° F. The blood count revealed 13,750 white blood cells per cu. mm. and 80 per cent neutrophiles. Sputum

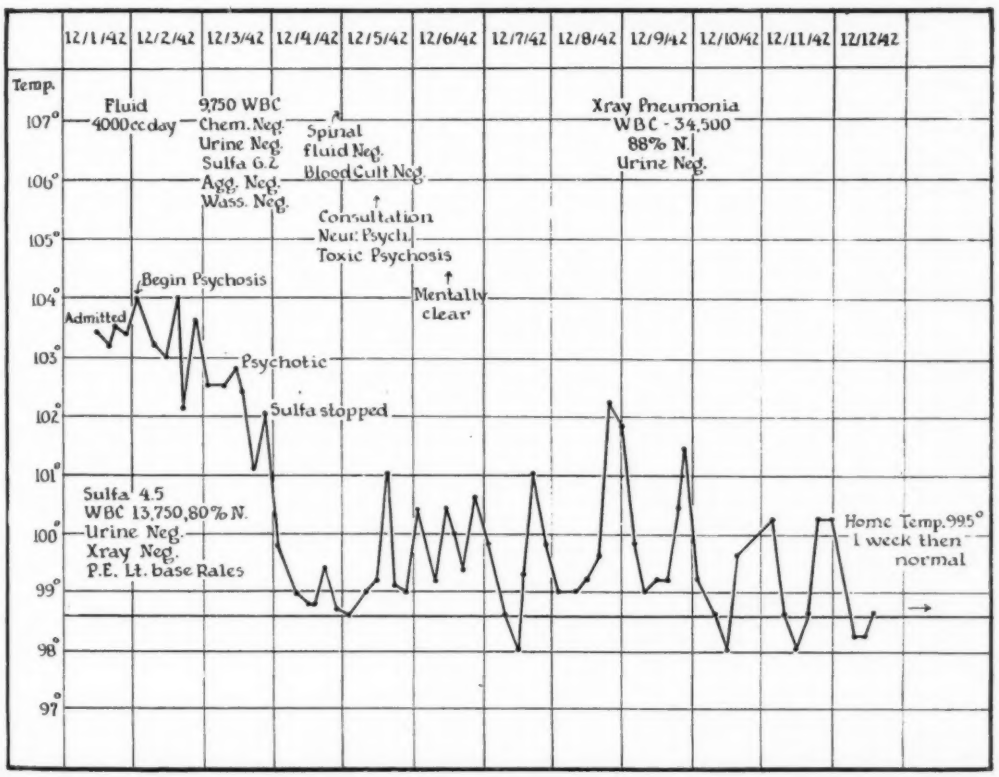

Chart II. Case of pneumonia (type indeterminable) showing reaction from sulfonamide and no therapeutic benefit.

tests were unsatisfactory. Urinalysis, blood chemical studies, serologic tests, tests for agglutination, spinal fluid, blood cultures, and roentgenologic examination of the chest furnished no diagnostic help.

Chemotherapy had been begun at the onset of the illness and was continued until the fourth day of hospitalization. At the time the patient entered the hospital the sulfathiazole level of the blood was 4.5 mg. per cent.

The patient's general condition as well as his pneumonia had shown no improvement under therapy, and the day after admission he developed a toxic psychosis. The disorientation progressed to such a degree that he had to be restrained. Finally, because no other cause for the psychosis could be found, chemotherapy was discontinued.

Improvement occurred at once. The psychosis rapidly disappeared, the temperature fell, and the subsequent course of the illness was not unlike that of a moderately severe pneumonia terminating by slow lysis. Blood chloride determinations, as suggested by Luetscher and Blackman[15] in a somewhat similar case, in which cerebral damage was persistent, were unfortunately not carried out.

The psychosis and continued temperature elevation in this case were by all indications caused by sulfonamide therapy, which at the same time had no effect at all on the primary infection.

SUMMARY

A brief and essentially simplified review of sulfonamide therapy in internal medicine has been presented, the most important considerations of which may be outlined as follows:

1. Medical diseases caused by sulfonamide-affected organisms (pneumococcus, staphylococcus, streptococcus, meningococcus, bacilli of the dysentery group, and probably *H. influenzae* and *B. mucosus capsulatus*) have been successfully treated by chemotherapy.

2. A more or less standard dosage has been accepted for routine use and, except in extreme cases, is apparently essential to accomplish a maximum therapeutic effect with a minimum of risk.

3. The oral route is satisfactory in the majority of cases in attaining and maintaining a satisfactory blood level. The intravenous and subcutaneous routes may be advantageously used in special circumstances, but intraspinal therapy in meningitis has been discarded.

4. Sulfadiazine is apparently the compound of choice, being as effective as any of the other sulfonamides and considerably less toxic.

5. Effective dosage over a short period of time (less than six days) will diminish the incidence of toxic reactions to the sulfonamides.

6. Careful clinical and laboratory examinations will go far to prevent toxic reactions from chemotherapy and are important guides to therapy if such untoward effects occur.

7. Maintenance of a satisfactory fluid balance and alkalinization of the urine are usually effective prophylactic measures against renal complications.

8. Further studies, perhaps with other compounds, are necessary to overcome the present obstacles in the treatment of diseases caused by organisms which hitherto have proved resistant to sulfonamide therapy.

9. Some progress has already been made in solving the problem of sulfonamide-fastness.

10. Judicious use rather than promiscuous abuse is the most satisfactory approach to successful chemotherapy in clinical practice.

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SULFONAMIDES IN SURGERY

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Consciously or unconsciously by our presence, and by the discussion of the subject this evening, we are once again paying tribute to Pasteur who: "First opened our eyes to our multitudinous enemies in the kingdom of the infinitely little," (W. W. Keen). We also pay tribute to Lister who elaborated antiseptic principles for the treatment of wounds based on Pasteur's work.

Surgical development has depended upon loyalty to the ideals of the fathers of medicine; devotion to the duty of saving human life; alertness, and research for new principles, and the utilization of methods and agents, for the application of advances in biological, physical, and chemical methods.

"It falls to the lot of few men to appreciate the effect of various modes of treatment in a particular disease; for if a patient recovers, whatever was the treatment, whether good or bad, we flatter ourselves it was the effect of our superior merits in conducting the disease; but future experience may convince us that the recovery of which we so vainly boasted, was the victory of nature over the malpractice of art," (Kentish—1797).[1]

Since Lister's day thoughtful pioneers have tried to find the ideal antiseptic for local application and for parenteral purposes. Countless agents have been used locally. Many times within the last forty years, enthusiastic reports have been made relative to the value of a specific agent. The present experience is no exception.

To Ehrlich we are indebted for the establishment of many of the sound fundamental principles of chemotherapy. Both success and failure have crowned the achievements of many enthusiasts who sought in the interval between early time and the present, to give us specifics for various types of bacteriemia and septicemia.

Some may remember the enthusiastic wave which followed Hugh Young's announcement of the intravenous use of mercurochrome and gentian violet; others may remember the claims which were made for urotropin as a bacteriostatic—or bactericidal agent when administered in large doses in gallbladder disease, typhoid, and meningeal infections.

It is well at the outset for us to remember that we must not discard recognized principles, but, rather should we accept the sulfa drugs as agents to be used in conjunction with surgery and not as a substitute for surgery, and this particularly applies if there is already present a localized infection.

The literature which has developed on the use of sulfonamides in surgery during the last few years is too large for one to attempt to cover completely. Many of the papers are restatements,—few deal with fundamental principles. Many antiseptics are used without knowledge of the action of the agent, whether it is bacteriostatic, or bactericidal. Many failures in the use of the sulfa drugs are due to the fact that at times inhibiting factors on the action of the drug in particular tissues are not considered. I think that it cannot be denied that in the use of the sulfa drugs many people have followed blindly high powered eloquent salesmen, whether they be surgeons or detail men who, though sincere, place emphasis on the wrong feature in the scheme by which success has been at-

tained. It is axiomatic that no finality can be attained until ultimate knowledge has been achieved. This is the utopia which we cannot conceive with our finite mind. Fundamental surgical principles, the basis of whatever modicum of success is attained, usually find their way to the surface.

(1) In duscussing sulfonamides in surgery it is essential for us to understand that these drugs act with more facility on some organisms than on others; (2) that their action is probably not bactericidal, but bacteriostatic, and the extent to which they are bacteriostatic depends on the blood concentration of the particular drug. The relative solubility of the particular drug makes one agent more active than another.

Hamilton Bailey[2] reminds us: "There is little evidence that chronic infections due to an organism are materially influenced by chemotherapy, even though acute infection with the same organism responds well to the particular sulfa drug."

It is well to recognize the toxic effects of the various sulfa drugs. A low concentration of sulfa drug is ineffective and a high concentration is toxic. A mean level if attained rapidly is effective.

Recognizing the fact that toxic effects do occur, a surgeon in the management of his patient should not overlook the utilization of the proper procedures for overcoming the ravages of the bacterial infections on the body. From an article on the prevention of infections in wounds and burns, (prepared by the Committee on Chemotherapeutic and other Agents, and the Committee on Surgery of the Division of Medical Science of the National Research Council)[3] the following is quoted: "It is now known that two biological factors play an important part in the healing of all types of wounds and burns, deficiency in plasma protein and vitamin deficiency."

This necessary warning is given that we do not depend entirely on the use of chemotherapy, and overlook important biological facts and surgical principles. The Council also reminds us that "tissues cannot regenerate maximally unless protein is available for cellular proliferation."

End results are dependent on the combined utilization of all available agents, methods, and biological principles at our command if we are to obtain maximum success in the handling of our patients.

The organisms which respond best to sulfonamides locally applied are the streptococcal group, particularly of the beta-hemolytic type and colon bacillus infection. According to many writers, staphylococcal infections do not respond well to the sulfa group. Hamilton Bailey states: "Staphylococcal infections are difficult to treat, as no chemotherapeutic agent yet discovered has an outstanding activity on the organism. Clostridial infections still remain in the undetermined group as to the exact value and exact place that chemotherapy will have in the treatment of these infections."

In the circular letter issued by the Surgeon General's office, February 23, 1942,[4] the following may be found: "Gas bacillus infection—in serious injuries where gas bacillus infection is likely, it is recommended that all rational surgical procedures, such as debridement may be carried out as soon as possible, and that all necessary supportive treatment be administered, sulfanilamide is at present recommended as the drug of choice.

"The use of polyvalent gas gangrene antitoxin when in the opinion of the Medical officer its use is indicated."

STERILIZATION OF SULFA DRUGS

There is a difference of opinion as to whether various sulfa drugs should be sterilized prior to using.

Hamilton Bailey has said: "Provided a reputable sulfonamide preparation is used there is no necessity to sterilize it before application to an open wound.

"Herrell and Brown have never seen and do not know of any incident in which the development of infection due to spore forming organisms could be attributed to the introduction of any of these drugs into an infected wound."

Welsh, Slocum, and Herwick,[5] state that sulfonamides contaminated with tetanus spores and implanted in guinea pigs will not protect these animals from the develop-

ment of tetanus. They report a fatal case of tetanus which developed following the use of unsterile sulfapyradine powder after a pelvic operation. On the basis of their experiments they advise: "All sulfonamide powders for use in deep wounds should be sterilized before use."

The most startling and valuable report on the use of sulfa drugs, a report which eclipses all experimental work, was the clinical experience obtained as a result of the Japanese attack at Pearl Harbor.

Moorhead[6] reported, as a result of this experience: "that purulent exudate was practically absent, so much so that it became the subject of universal comment."

John S. Lockwood,[7] commenting on the Pearl Harbor experiences, stated: "The growing weight of evidence justifies the opinion that the major problem of infection in traumatic wounds may be avoided by a proper combination of surgical treatment and sulfonamide therapy.

"Sulfanilamide is preferred for topical use in clean or contaminated wounds. The main advantages of sulfanilamide for topical prophylactic use are its high solubility, efficient diffusion, and its lack of interference with normal wound repair—properties in which sulfadiazine and sulfathiazole appear to be relatively at a disadvantage."

The Military Surgical Manual[8] states: "Although still in the developmental stage, the use of certain drugs of the sulfonamide group, for combating pyogenic infection in wounds and infection of the blood stream, already has been demonstrated to be one of the great therapeutic advances of the decade. Application of these drugs locally in the wounds, and administration by mouth and parenterally to the wounded soldier and civilian, is now being generally adopted. For the anaerobic, gas producing infections, compounds that liberate oxygen, such as zinc peroxide, as well as the serum from animals immunized to these organisms, are saving lives and limbs of those whose wounds are contaminated with these anaerobes. The general administration of tetanus toxoid to the troops when inducted into military service is proving even more effective than immunization with tetanus antitoxin in preventing tetanus among the wounded."

In a recent report by the Committee on Chemotherapy and the Committee on Surgery of the Division on Medical Science, of the National Research Council we find application of one of the most progressive steps since sulfonamide drugs have been introduced, that is the feasibility of delayed debridement and closure. "Recent experiences demonstrated beyond doubt the value of the application of crystalline sulfonamide to wounds which are awaiting debridement. There is every evidence that it prevents the development of infection in contaminated wounds. *Regardless of the number of hours a patient is seen after the wounding, if the wound has been treated with crystalline sulfanilamide, debridement should be carried out.*"

This is definitely valuable as a progressive step in the handling of war wounds. It is recommended by the Committee that sulfanilamides be given in 1 gram doses every four hours in conjunction with the local application of the sulfanilamide pack in the wound.

From the foregoing it is not to be understood that the use of sulfa drugs in the wound, where time permits should be considered as a substitute for the basic principles in wound treatment.

The presence of pus or dead or dying tissue interferes with the efficient action of the sulfa drugs. In order to accomplish the best results when these drugs are used there must be drainage of any purulent accumulation.

Sulfa drugs have been suggested in the treatment of peritoneal infections. The logic of success in the use of these drugs in the peritoneum has been demonstrated by experimental work of Ravdin, Rhodes and Lockwood:[9] "Since transudation is known to occur into the peritoneal cleft, it was of interest to determine whether sulfanilamide passed from the blood into the peritoneal transudate or exudate.

"In the dog receiving sulfanilamide we have found that the drug passed rapidly

into fluid injected into the peritoneal cavity.

"Dogs previously anesthetized with sodium amytal were given intraperitoneal injections of physiologic saline solution one hour after receiving sulfanilamide solution by hypodermoclysis. One half hour later a sample of peritoneal fluid was aspirated and the sulfanilamide concentration determined. Even in this short time the level in the peritoneum had risen to nearly one-half of the blood level."

From the above it is logical to conclude that the giving of sulfanilamide either by hypodermoclysis or intravenously actively aids in the overcoming of peritoneal infections.

Sterling Mueller and James K. Thompson[10] have confirmed the work of Ravdin and they advocate the use of 6 or 8 per cent of the pounds of the body weight in grams be introduced intraperitoneally. They caution that the dose should never exceed 18 grams and this amount should only be used in severe cases.

Bowers[11] cautions against introducing large quantities of sulfanilamide powder into the peritoneal cavity because of the rapid absorption from the peritoneum and the damage to the liver, which occurs in some patients who have had more than 5 grams of the drug introduced into the abdomen. He says: "I have seen three patients die of toxic hepatitis following the peritoneal introduction of 10 grams of the drug."

Fred Coller agrees with Bowers, however, that 5 grams intraperitoneally is the maximum amount which should be used. It is important therefore, that the amount introduced directly into the peritoneum should be carefully considered.

Great controversies have developed with regard to the use of the sulfonamides in osteomyelitis. In the recent literature on osteomyelitis one can find authority, if one considers every report as authoritative for every form of treatment from sulfa drugs alone, a combination of surgery, sulfa drugs, and antitoxin, or surgery plus sulfa drugs.

The present opportunity is not offered to discuss the treatment of osteomyelitis, but only that phase of the treatment which includes the use of sulfa drugs.

In the recent literature Albert Key of St. Louis, reasserted his belief in early operation in the majority of cases. He delays operation only long enough to combat dehydration. In addition to local chemotherapy he uses antitoxin in selected cases. The use of antitoxin is based on the fact that while "sulfonamides are antibacterial it does not mean that they are antitoxic." (Hamilton Bailey)

John Wilson of Los Angeles stresses the importance of understanding that acute osteomyelitis is a disease of the whole organism, not only a pyogenic infection of the bone. He believes that drainage should be instituted after the effects of the generalized infection have been overcome.

Pemberthy and Weller believe in early and adequate surgical drainage and the use of the sulfa drugs which they believe "apparently" limit the complication of the disease.

Paul Callona deplores radical operations in the acute stages of the disease.

A few facts should be considered: (1) Most of the cases of hematogenous osteomyelitis are staphylococcal in origin: (2) none of the sulfa drugs are specific for the staphylococcus; (3) it is important for us to remember that none of the drugs act well in the presence of pus; (4) in all surgical conditions in which we suspect abscess formation drainage should be instituted.

Osteomyelitis is one in which the sulfa drugs should be used in conjunction with surgery and not as a primary method of treatment.

It would do no good to prolong the discussion of the relative merits of surgery versus sulfa drugs in osteomyelitis. I do not believe that it should be necessary to do so. A surgical procedure plus any adjunct is desired rather than one without the other.

CONCLUSIONS

Errors and abuses in the use of the sulfonamide group of drugs continue to be made. Methods are often substituted for fundamental surgical principles. It is wise to remember that the sulfonamides and other forms of chemotherapy are adjuncts to be used in combination with recognized surgical principles. Chemotherapy is not a substitute for surgical intervention. It has been demonstrated many times that the action of chemotherapeutic agents are inhibited by the presence of devitalized cellular elements which are the product of infection or injury. To function well the sulfonamides must not be inhibited by pus or dying tissue.

Abuses in the use of chemotherapy are made by those who use routinely a particular drug irrespective of the type of organism. Errors are made in the use, and abuses follow if appropriate dosages are not observed. Insufficient dosage to produce necessary blood concentration are ineffective; overdosage produces toxic effects. The dose of sulfonamides must be controlled by proper and regular studies of blood concentration. These drugs are abused when careful observation for toxic manifestations are not made.

Careful studies should be made at regular intervals to note the effect of the sulfonamide on the hematopoietic system.

These are powerful agents for good if properly used. They are dangerous when carelessly handled.

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SULFONAMIDES IN UROLOGY

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Of all the various sulfonamide preparations used in urology, sulfathiazole and sulfadiazine, or their sodium derivatives, are the two principal ones. There is no doubt that these drugs have greatly improved the results obtained in the treatment of urologic cases, both surgical and otherwise, although present experience indicates quite clearly that none of them are absolutely innocuous, but may in certain individuals and under certain circumstances act as lethal poisons.

Generally speaking, the colon and pyogenic groups of bacteria are the ones on which their effect is most pronounced.

Individual susceptibility varies. I know of one patient in whom a single dose of ½ gram of sulfathiazole produced a temperature of 106° on each of the several occasions that it was tried.

Ambulant patients, and particularly young individuals, definitely tolerate the sulfonamides better than older ones, or those so weakened by illness, regardless of the nature, as to require them to be bedridden or hospitalized. As a proof of this fact it is my custom to give ambulant office patients, unless they are quite old, 4 grams of sulfathiazole daily for periods of from four to six weeks, and in only about 5 per cent of them is it necessary to discontinue the drug because of adverse reactions, most of which are trivial. However, in the treatment of more seriously ill individuals a number of definite rules should be observed.

Except under special circumstances, the dose of the drug should not be more than 1 gram every six hours, or the equivalent thereof. The fluid intake should be 3000

c. c. and the output never less than 1000 c. c. every 24 hours. An output lower than this constitutes a definite warning. A complete blood picture, non-protein nitrogen estimation, and if possible a P. S. P., should be done before or as soon as sulfonamide therapy is instituted. Should the white count drop to 5000, the red count to 3,000,000 or under, or the non-protein nitrogen rise to any marked degree, the drug should be stopped or at least the dose decreased at once. Under such circumstances there will invariably be a diminution in the P. S. P. excretion as well. Sulfonamide blood levels of over 12 mg. per cent always bear careful watching. High blood levels occurring in patients who have received a comparatively small amount of the drug often indicate previously existing hepatic or renal damage.

Renal injury seems to occur more frequently from sulfadiazine than from sulfathiazole, although it may result from either. A rapid decrease in the urinary output is often followed by a complete suppression. Should this occur the drug must be discontinued at once, the patient given up to 5000 c. c. of fluids, either by vein or by mouth, every 24 hours, and alkalies administered. If this fails to restore renal function, cystoscopy with lavage of the renal pelves is indicated promptly. Hemorrhage within the pelves of the kidneys, crystal blocking of the convoluted tubules and complete destruction of the renal parenchyma has occurred following the administration of as little as 12.5 grams of sulfathiazole.[1]

The sodium salts of either sulfathiazole or sulfadiazine may be, and are frequently given by vein or by hypodermoclysis. The dose by vein is rarely over 2 grams and 5 grams in 1000 c. c. of isotonic saline solution is suitable for subcutaneous administration.

The use of sulfonamides following cystoscopic procedures and office instrumentation has reduced the number of reactionary chills and fever to a minimum. The local application as well as the internal administration of the drug has greatly lessened the hazards of urologic surgery. The use of solutions of these drugs in the local treatment of bladder or renal infections has not in my own experience, proved particularly beneficial, although gonorrheal vulvovaginitis in children seems to respond nicely to instillations of sodium sulfadiazine in a 2½ per cent solution.

The proper treatment of gonorrhea, in both the male and the female, in my opinion, requires local treatment as well as sulfonamides orally. Sulfathiazole in doses of 4 grams daily is the drug of choice. It has been stated that 19 out of 20 men are rendered non-infectious for gonorrhea by the administration of 20 grams of sulfathiazole.[2] This is not borne out by my own experience. While that amount of drug often does result in a complete or almost complete disappearance of the urethral discharge, and a belief on the part of the patient that he is cured, a large percentage of patients still harbor the infection which promptly recurs following provocative instrumentation, coitis or alcohol. There is no doubt that many innocent individuals have been infected by those who believed themselves cured by the use of one of the sulfonamides alone. While the length of treatment and the occurrence of complications in gonorrhea of both the female and male has been markedly decreased by the use of sulfonamides, one must not be misled by the usual rapid disappearance of visible signs of the disease nor be less careful in the final determination of a complete cure.

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SULFONAMIDES IN GYNECOLOGY AND OBSTETRICS

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Although it has been less than ten years since the publication of the initial investigations on the value of sulfonamides in combating infection, these drugs are now widely used in a variety of conditions which are treated by every specialist. It must be remembered that these derivatives should

be used only in those infections caused by organisms against which it has been conclusively proved that they have a specific effect. Thus, it can readily be seen that the administration of the sulfonamides as a prophylactic measure in obstetrics and gynecology is to be condemned. Experimental as well as clinical studies have shown that sulfathiazole is preferable to other derivatives for most infections because it has a specific action against a greater number of organisms, has a less toxic effect and is excreted more slowly. On the other hand, sulfanilamide has proved to be the best derivative for local application to infected surfaces. Chemotherapy, when selected, should be instituted early and administered systematically in adequate doses. Of course, the dosage should be controlled by frequent determinations of the concentration of the drug in the blood.

The use of the sulfonamides in gynecologic and obstetrical conditions may be discussed briefly under the following headings: (1) acute specific infections; (2) puerperal infections; (3) breast infections; (4) trichomonas infections of the vagina and (5) gynecologic surgery.

ACUTE SPECIFIC INFECTIONS

Ambulatory patients with acute local infections of the genital tract should be given 1 gram of sulfathiazole four times a day for three days, followed by 1 gram three times a day for two days. Following this medication, cultures and not smears should be made and, if virulent, specific organisms are found, the therapy should be repeated. Lankford and Cooke[1] suggest a *minimum* of six negative cultures at weekly intervals, including one or two post-menstrual cultures, before these patients are released from observation.

The local insufflation of sulfonamide powder in the vagina is of no value in the treatment of infections in the lower genital tract.

In cases of acute salpingitis of specific origin, the same dosage should be used as for ambulatory patients with acute local infection of the genital tract. The sulfa drug acts best given within five days of the beginning of the infection. However, two points should be kept in mind: first, this drug has no effect after pus has collected, such as in cases of tubo-ovarian abscesses or of local collections of pus in the pelvis, and secondly, the basis of the treatment of acute infections of the pelvic organs is rest and supportive measures, such as transfusions, and the sulfonamides should be used only as an adjunct to this treatment.

PUERPERAL INFECTIONS

The sulfonamides have their greatest value in the treatment of puerperal infections. They have been of no benefit in combating postabortal and postpuerperal infections due to anaerobic cocci and staphylococci, because the pathologic condition in such cases is principally one of a thrombophlebitic process. However, the drug has a definite value in cases of septic abortion. Johnson and Talbot[2] recently reported a series of 44 cases of septic abortion in which the routine method of treating such cases was supplemented by the administration of an initial dose of 3 grams of sodium sulfathiazole by mouth, followed by one gram every six hours for five or more days. From a comparative study of this group of cases with those which did not have chemotherapy, they noted a definite reduction in the mortality rate.

BREAST INFECTIONS

It is generally agreed that the sulfonamides are advantageous in the prevention of abscesses of the breast. However, the drug should not be administered to any patient with painful engorgement of the breast during the first few days following delivery. After a period of time has elapsed, if painful nodules develop which suggest a localized or beginning general infection of the breast, the drug is indicated and in most cases will prevent abscess formation.

TRICHOMONAS INFECTION OF THE VAGINA

In my experience the sulfonamide compounds have been most unsatisfactory in the treatment of trichomonas infections.

GYNECOLOGIC SURGERY

For the past ten months I have used sulfanilamide powder on the closed vaginal

vault following total hysterectomy before peritonization of the operative field is completed. The drug is insufflated over the closed vaginal vault with a powder blower, rather than dumped into the cavity in a lump where it might accumulate as a foreign body. After peritonization has been completed, the powder is insufflated over the broad ligament structures and cul-de-sac. In the last 60 hysterectomies in which I have used sulfanilamide the morbidity has been reduced by one-half.

In operations for ovarian abscesses the local insufflation of the drug over the operative field is a distinct adjunct to the surgical treatment.

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SULFONAMIDES IN OTOLARYNGOLOGY

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Since the discovery of prontosil as a chemotherapeutic drug by Gerhardt Domagk in 1935 more than 3000 related compounds have been synthesized and tested.

The disodium salt of prontosil called neoprontosil or sulfanilamide was shown to break down in tissues at the azo linkage into triaminobenzene and para-aminobenzene sulfonamide, the latter was assumed to be the effective pharmacologic portion of the molecule. Of the more than 3000 related compounds, only a few with the basic sulfanilamide molecule have shown chemotherapeutic activity, hence these few represent the sulfonamides.

In otolaryngology many of the sulfonamides have been used: (a) prophylactically; (b) to treat coccal diseases; (c) to prevent complications and extensions to the adnexa and (d) to treat complications. They are used systemically and locally—systemically by oral, intramuscular, intravenous and intrathecal medication—locally in the form of powders, ointments, jellies, solutions, suspensions, in various solvents, as loose addition products mixed with allantoin, given in combination with arsphenamines and used with pressor drugs as the vasosulfa drugs.

In general the drug should be administered early, and because of the histologic structure of the organs of this specialty large doses should be given if bacteriostasis is to be accomplished. The dosage should be maintained until leukocytosis approaches normal, providing sensitivity to the drug has not developed or untoward complications have not occurred. Do not overdose the patient to a leukenoid state (agranulocytosis). The reticuloendothelial system, body immunity, fibroblasts, epithelial and ciliated epithelial cells are not affected when the drug is judiciously used and in proper strengths. In powder form or strong solution, it irritates mucosa, retards ciliary motility and is caustic because of its high pH 9-10. Excessive amount of powder cakes in wounds. Instilled into the nasal sinuses as a powder or suspension, it has remained as long as six to eight weeks, and is detrimental because of not being absorbed. The sodium salts in strong solutions are more caustic and will destroy cilia and epithelium. In weak solutions it is of questionable value.

When administered systemically, large doses must be given early while the blood stream is yet free of thrombi, and the bacteria are not surrounded by cellular infiltration and proliferation, so that the drug can be carried to the bacteria at the seat of infection within the tunica. Because the blood supply is distant to the lumen of the sinus, the middle ear and mastoid cells, which are other sites for the accumulation of organisms, little concentration is obtained and consequently poor bacteriostatic action is accomplished. The sinus and ear mucosa does not excrete the drug to the extent as does the kidney, consequently a therapeutic concentration is not obtained. The pus and debris which results from suppuration contains peptone that also limits the action of sulfonamides. And lastly mucin secreted by mucosa is another great sul-

fonamide inhibitor. Consequently, it is understandable why sulfonamide therapy is limited in the treatment of ear, nose and paranasal sinuses. In lesions of the oral cavity, pharynx and larynx these handicaps are aggravated by physiologic factors such as swallowing, salivation, and hawking. These factors prevent the drug from remaining on the affected surface in spite of the fact that in these areas, stronger preparations can be applied because of the more resistant non-ciliated epithelium.

Sulfadiazine, when systemically administered, is the drug of choice. It is acetylated less than other sulfonamides and therefore less liver damage is to be expected. It is conjugated into acetyl sulfadiazine which is the most soluble and excreted more easily by the kidney, thus less fear of kidney concretions. Penetration of cerebrospinal fluid has been excellent. There is little nausea and vomiting, and it affects all cocci. Locally the drug of choice should be predicated on the bacteriologic study, individual sensitivity and personal experience.

It is unwise to use massive doses of local anesthetics as procaine and the frequently used topical anesthetics as cocaine, pontocaine and metycaine, because para-aminobenzoic acid is another sulfonamide inhibitor. Likewise in the early administration of sulfonamides, vitamin B complex should be discouraged. Later in the treatment, particularly on the first evidence of the development of a leukenoid state, vitamin B complex should be given because of its folic acid content which may prevent agranulocytosis.

Biotherapy in conjunction with sulfonamides when possible should always be considered. Specific sera and other adjunct measures should not be neglected. Always be on the alert for toxic manifestations of the drug. And in cases not responding rapidly, suspect the development of a sulfonamide-fast organism. This is important because of the malicious indiscriminate abuse of the drug in nasal and systemic administration. Not only may a sulfonamide-fast organism occur, but sensitivity to the drug may develop with the production of an allergic state. There is some conjecture among otolaryngologists as to the possibility of creating an epidemic of a sulfonamide-fast organism.

The sulfonamides should neither be expected to cure circumscribed suppurations within soft tissues nor walled off suppurations within bony cavities. Middle ear abscesses, and empyemias of the sinuses require surgical intervention. Nevertheless, there is no objection to these drugs given prophylactically in such existing circumstances.

In otolaryngology the sulfa drugs have been used for practically all diseases and complications affecting the ear, nose and throat. They have been used in the treatment of the "common cold," sore throats, after tonsillectomy, tracheotomy, before, during and after laryngectomy, acute and chronic sinusitis, the various diseases of the external ear, the various types of acute and chronic otitis media and mastoiditis, laryngitis, acute laryngo-tracheo-bronchitis and bronchiectasis. They also have been used postoperatively in wounds after mastoidectomy, paranasal sinus surgery, petrosectomy, and fenestration operations upon labyrinth. In some instances they have been used to advantage in such complications as osteomyelitis of the cranial bones, lateral sinus thrombophlebitis, meningitis and brain abscess.

A review of the various methods, type of drug and dosage used, and the results obtained therefrom cannot be summarized. This is primarily due to the limited literature upon the subject much of which has failed to demonstrate conclusively the usefulness of these drugs. Nevertheless otolaryngologic cases so treated conclusively fall into two groups:

Group 1. Those in which the sulfonamides are known and proved to be effective, such as in meningitis, thrombophlebitis of the lateral sinus with septicemia and streptococcic sore throat.

Group 2. Those in which the drug is not known but *presumed* to be effective, such as the "common cold," "la grippe" and chronic sinusitis.

In the treatment of nasal and paranasal sinus diseases, it has been almost universally discovered that in the "common cold," chemotherapeutic agents are substantially without influence. More enthusiasm has come forth in the literature on the treatment of paranasal sinusitis. Many sulfa drugs and combinations have been advocated. The following is a list of the sulfonamides which have been used:

I. Sulfa drugs, systemically
   (a) Sulfanilamide
   (b) Sulfadiazine
   (c) Sulfathiazole
   (d) Sulfapyradine
   (e) Sulfamethyldiazine
   (f) Sulfamerazine
   (g) Sodium salts

II. Sulfa drugs, locally
   (a) Sodium salts in solution
   (b) Suspension (microform crystals 5 and 20 per cent)
   (c) Jelly
   (d) Vasosulfa drugs (sulfonamide combined with a pressor drug)
      (1) Sulmefrin (2.5 per cent sulfathiazole and 0.125 per cent dl-desoxyephedrin hydrochloride)
      (2) Sulfedex (same as above)
      (3) Sulfamone (same as above)
      (4) Thizodrin (same as above)
      (5) Sulfathiazole—Paredrine suspension (5 per cent of microcrystals of sulfathiazole in a 1 per cent aqueous solution of paredrine hydro-bromide; suspension pH 5.5)
   (e) Loose addition product. Sulfallantoin (a powder of sulfathiazole and allantoin). The allantoin is added to destroy the sulfonamide inhibitor (peptone) and to favor fibroblastic and angioblastic formation.
   (f) Solvents, in
      (1) Triethanolamine
      (2) Propylene glycol
      (3) Glycerine
   (g) Gum (sulfadiazine in paraffin)
   (h) Lozenges

III. Sulfa drugs given with neoarsphenamine

This list of the variety of drugs is in itself some indication of the unsatisfactory results obtained in the therapy of otolaryngologic diseases, especially sinusitis. In spite of this fact new and more combinations should be investigated with the hope that better results may be accomplished. The sulfa drugs systemically and locally used in sinusology have been limited by the concepts mentioned previously in this discussion. My results have not been as promising as those of Turnbull with desoxyephedronium sulfathiazole a vasosulfa drug, better known under the names of sulmefrin, sulfamone and thizodrin. Its pH 8.6-9, more alkaline than the nasal pH, yet what is the normal pH? It is said to be pH 5.5-6.5 and this is still debatable. It is isotonic and yet many of us believe a slightly hypertonic solution is more ischemic to turbinal tissue. It is true of the synergistic vasoconstrictor effect of the combination of the two drugs in which the 1/8 per cent didesoxyephedrin hydrochloride in 2.5 per cent sodium sulfathiazole is as effective as a vasoconstrictor as 1 per cent aqueous didesoxyephedrine hydrochloride. It is true the drug is not irritating and does not affect ciliary motility, does not injure mucosa and is a stabilized solution. In view of these facts, it has not proved itself to be an effective bacterial agent in the treatment of nasal and paranasal sinus disease up to now, in so far as my experience is concerned. It has been used by me as sprays and instilled into the sinuses with no startling results.

Sulfathiazole 5 per cent microform crystals in 1 per cent paredrine hydrobromide also has been used by me as sprays, and instillations within the sinuses with far from satisfactory results, although L. D. Sulman of Philadelphia reported its used in over 75 cases of rhinitis and sinusitis, in which he states it shortens the course of infection and averted sequelae to colds. L. E. Silcox and H. P. Schenck of Philadelphia report that the microcrystals are removed from sinus cavities within four or five days, either by ciliary movement or by absorption. It has been my experience that the drug has remained as long as eight weeks, at which time some of it was removed by lavage.

B. S. McArthur, Los Angeles, uses a sodium sulfathiazole jelly in the treatment of colds in which relief was obtained in every

instance except one out of 2000 patients treated.

The drug used in solvents has not been very satisfactory because of the irritating effect of the solvents on mucosa. This is particularly true of propylene glycol. Glycerine, propylene glycol and triethanolamine are the most frequently used. One may well recall the toxic effect of one of the earlier solvents used which resulted in a great tragedy, diethlene glycol. J. E. Bradley and S. J. Crowe, of Baltimore, have recommended the use of 2.5 per cent sulfadiazine in triethanolamine solution as instillations in the nose for colds and found it to prevent ear and sinus complications. Twenty c. c. were used daily as spray of nose and pharynx, eight times daily for the first day, five times daily for three or four more days.

In tonsillitis, pharyngitis and the postoperative treatment of tonsillectomy, sulfagum (sulfadiazine in a paraffin block of suitable size for chewing) and lozenges containing sulfadiazine have been used by J. H. Arnett of Philadelphia.

Various sulfa drugs have been used to advantage as a powder about the tracheotomy, laryngectomy and mastoid wound. It is also advantageous in petrosectomy and fenestration operations on the labyrinth and extirpation sinus surgery.

In otology the sulfonamides may contribute towards the prevention of otitis media when given in early upper respiratory infections, although it will neither cure an acute suppurative otitis media nor a surgical mastoiditis. The sulfonamides will not supplant surgery. In acute otitis media one of the problems which may confront the otologist is that of masking of symptoms. In such cases the drug may have to be discontinued or frequently repeated radiographs made. The usual sepsis indicators, temperature and leukocyte counts are of no avail. Occasionally a drug reaction may be confusing from the standpoint of an otitic complication and this may be an even more difficult problem. In acute otitis media the sulfa drugs have justly merited their use in the prevention of mastoiditis. They are of no value in chronic suppurative otitis media with attic or ossicular necrosis and chronic mastoiditis with or without cholesteatoma. The sulfa drugs have failed because surgical intervention is imperative. Sulfallantoin in the treatment of selected cases of chronic otitis media may have value because of its anti-inhibitory effect upon peptone.

In laryngology the drugs have been used as insufflations, in suspension with and without the vasoconstrictors as sprays, instillations in the form of "smoke" spray inhalations in laryngitis, laryngo-tracheobronchitis, chronic bronchitis and bronchiectasis. Favorable reports are yet to be forthcoming.

The use of sulfonamides in conjunction with arsphenamines as reported by Asgood and Moore may be of value in deep cervical, parapharyngeal and retropharyngeal abscess particularly when due to Vincent's organism, associated with a streptococcus or another coccal organism. Some of the otitic and rhinologic complications, lateral sinus thrombophlebitis, meningitis and osteomyelitis of the cranial bone have been undisputedly benefited by local and systemic administration. Osteomyelitis due to an anaerobic organism requires immediate surgical intervention. The wound should be layed wide open and zinc peroxide packs or stayogen packs should be introduced at the beginning, following later by a sulfonamide powder.

NEW ORLEANS
Medical and Surgical Journal

Established 1844

Published by the Louisiana State Medical Society under the jurisdiction of the following named Journal Committee:

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THE JOURNAL *does not hold itself responsible for statements made by any contributor.*

THE ANNUAL MEETING

Again editorially we will call your attention to the coming meeting of the Louisiana State Medical Society. This year the officers of the State Society have decided to go back to the holding of the scientific meeting as well as a business session. This is, we believe, very definitely an excellent decision. Even in spite of war and the overworking of the medical profession, nevertheless a scientific meeting will bring the doctors up to date in things medical and surgical, and will refresh and reburnish their minds.

The two day scientific session will allow for an excellent program. The program will be constructed somewhat differently this year than previous years, and the efficient secretary-treasurer has arranged with the chairmen of the different sections to get outstanding speakers and to have rather complete expositions on the subjects which the essayists will present to the organization. We are sure that the scientific program will be very well worth hearing.

In the past we have called attention to the advisability of attending these meetings, and what we have said in the past holds with greater force now than ever before. Not only do the members of the State Society have the opportunity of freshening up on their knowledge of contemporary medicine, but to them also is afforded an opportunity of getting away from the office and leaving the ubiquitous telephone to its own devices. We know that all doctors in Louisiana are doing double duty and that the demands on their time are overwhelming, but we urge them to get away for a few days for rest and relaxation and to obtain scientific information. Certainly the change from their every day duties even for two or three days will make a break of inestimable value to the doctors themselves, and indirectly to their patients. We sincerely hope that this next meeting, which will be held on April 24-26, will have a larger attendance, in spite of the reduction in the number of doctors in the state due to the military exigency, than have ever before attended the state meeting.

THE WAGNER BILL

The Council on Medical Service and Public Relations is sending out weekly bulletins relative to the activities and trends in medical affairs and medical legislation. In the last bulletin a speech of Dr. Wilburt C. Davison, Dean of the Duke University School of Medicine, which was delivered at the recent meeting of the Congress on Medical Education and Licensure, is quoted. Dr. Davison says that the physicians need more advertising, not as an individual but as a

group of professional men who are to say the least being treated rather roughly by socialistic demagogues. Such advertisement can be obtained indirectly through editorials in local newspapers, for example. A copy of an editorial from a North Carolina paper, backing up Dr. Davison's contention, was distributed by the Council on Medical Service and Public Relations.

Our suggestion is that too much dependency must not be placed on the officers of medical societies to defeat the Wagner Bill, but that this bill is more likely to be beaten by the cooperation of an entire medical profession. The individual doctor can talk to the editor of his local morning or evening paper and he can ask him to dilate upon the evils of socialized medicine, speaking to him as a friend, whereas an officer of the state organization may have little influence on the editor, who does not know him, except by reputation. If the individual doctor will, in his locality, express his dislike and his disapproval of the Wagner Bill to the editor of his local journal, and give to him information of the malignant influence that this bill would have on the medical profession should it become enacted, and the harm that it would do to the people of the country, we feel quite sure that this would be a contribution of great value, particularly when multiplied many times not only throughout the State of Louisiana but throughout the country as a whole.

BACK UP OUR ADVERTISERS

Members of the Louisiana State Medical Society probably do not realize that the journal is financed very largely through the monies received from advertisers in its columns. It is the advertisers who make possible to a very great extent the publication of the state medical journal. It seems only fair that these firms who advertise in the journal should receive the backing of the state profession. This is not a plea necessarily to make use only of the pharmaceutical preparations, books, surgical implements and what not that are advertised in the journal, but when there is no choice or little choice between one or the other of the pharmaceutical preparations for example, why not make use and prescribe those that are advertised in the journal? Furthermore, when detail men visit the doctor why not tell them that their advertisements are seen and read, but if these detail men represent firms who do not advertise in our journal, why not put in a good word for the journal.

An example of the almost total lack of cooperation by the physicians of states other than Louisiana, is a recent communication from the Cooperative Medical Advertising Bureau which places the great bulk of advertising that appears in state medical journals. The Cooperative Medical Advertising Bureau asks us to encourage our readers to take advantage of the medical preparations that are advertised in the journal, and also to take advantage of offers that are made in the journal. They give as an example of lack of cooperation a letter that was received from an advertiser who advertises in twenty-three different state medical journals, and who is cutting down materially on his advertising because the firm has had few responses from the doctors in the states in which they advertise. This particular advertiser has a coupon which he asks the doctor to fill out and to return to the advertiser, who in turn will send further information about the apparatus which is advertised. Two of the state journals elicited no inquiries at all from their readers, and most of them such a small number that the advertising is being taken away from the journals. Would it not be possible when such requests appear as they do from time to time in the New Orleans Medical and Surgical Journal, that you the medical reader could have your secretary or nurse cut out such a coupon, fill it out, and send it to the advertiser. This will certainly show some interest at least in the advertised material or apparatus.

We realize that when a physician is working eighteen hours a day he does not have much time to look over medical journals, and we know that this is a bad time to make a request such as we have done in the preceding paragraphs. Nevertheless we would like to point out once again, and to stress

the statement first made, namely, that the advertisers are responsible for a large part of the cost of medical publications, and that as loyal members of the State Society we should do our best to cooperate with those who make possible our state publication.

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NEPHRECTOMY IN HYPERTENSION

When, from the experiments of Goldblatt it became well known by the medical profession that a clamp applied to the renal artery of one kidney could produce hypertension, physicians everywhere began a still hunt for unilateral renal lesions in patients who had hypertension, motivated by the thought that removal of the offending kidney would cure the hypertension. For a period of time, it seemed that every patient who had elevated blood pressure was subjected to very careful functional kidney studies in order to find out if there was involvement of only one kidney, and if such involvement was found, that kidney was promptly removed.

The wave of enthusiasm that so often follows any new development in medicine has gradually subsided to a ripple. Physicians, urologists, are finding that while often a temporary reduction in blood pressure followed unilateral nephrectomy, eventually, in a comparatively short time, the pressure went back to the previous levels, or even actually increased. Consequently, the enthusiasm subsided to such an extent that only occasionally is the operation performed.

Sensenbach* reports on a small group of patients whom he has observed in the Bowman Gray School of Medicine and analyses the history of 75 patients with hypertension, taken from the literature, who were operated upon by the removal of one kidney. He states only 5 of these 75 patients met the requirements for possible cure after nephrectomy. In most of these patients, the most frequent pathologic condition was a chronic pyelonephritis. The author states that it is only an occasional patient in whom unilateral nephrectomy is indicated for hypertension and that these patients should be studied carefully and selected with acumen. This is especially important in those individuals who have a kidney which retains some functions, as the removal of this organ is likely to increase, rather than improve the hypertension.

Sensenbach gives the following criteria on which to base a selection of a patient who has hypertension who would be benefited by nephrectomy. These criteria are:

"1. The diseased kidney should be functionless or its function greatly diminished.

"2. The opposite kidney should function normally.

"3. The hypertension should be of short duration.

"4. Other factors being equal, the younger the patient, the greater the chances of favorable results following nephrectomy."

The author adds the statement that even though these criteria are fulfilled, there is no certainty that good results will be obtained, but certainly, at least if they are followed, the hypertension will not be made worse as a result of nephrectomy and relief may be obtained.

*Sensenbach, Willis: The effects of unilateral nephrectomy in treatment of Hypertension, Arch. Int. Med., 73:123, 1944.

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ORGANIZATION SECTION

The Executive Committee dedicates this page to the members of the Louisiana State Medical Society, feeling that a proper discussion of salient issues will contribute to the understanding and fortification of our Society.

An informed profession should be a wise one.

FUTURE MEDICAL PLANS

It was thought that the members of the Louisiana State Medical Society would be interested in learning some of the observations made at a recent conference in Chicago by our secretary-treasurer. These remarks do not represent in any way his opinion or those of the State Society, but merely is an informatory report to present the trends and thoughts of the day as

gleaned from these important medical conferences. These groups met in Chicago from February 12-16 inclusive.

On February 12 the Midwinter Conference on Pre-Paid Medical Service Plans met. This council has been sponsored more or less by groups of physicians in and around Kansas City. Their objects and purposes were to develop independently some service plan which would be acceptable to various states and localities. They had a wonderful program, highlighted by talks from Mr. John Pratt of the National Physicians Committee, Dr. Rufus Rorem of the Hospital Service Plan Commission of the American Hospital Association, and others.

On February 13 there occurred the National Conference on Medical Services. This organization has been in existence since 1926, and has performed wonderful service to the medical profession in bringing to their attention many questions concerning medical service in this country.

On February 14 and 15 there was a meeting of the Congress on Medical Education and Licensure. This program was sponsored by the Council on Medical Education and Hospitals of the American Medical Association. The program was very illuminating and was presented by very capable physicians on subjects concerning our present status in regard to medical education and vital subjects of postwar planning. Fused with the program was the Federation of State Medical Boards which for a number of years has contributed toward the solidity of the standards of medical practice over the entire United States. It was very gratifying to notice here the activity and influence of Dr. Roy B. Harrison, Secretary of our State Board of Medical Examiners. Certainly from this approach we can have reasons to be assured of continuous protection to the medical profession in our state along the high standards evidenced in the past.

The Council on Industrial Health of the American Medical Association held their meetings on February 15 and 16. Their program more or less was of problems concerning the changes in the industrial life of the nation and resulting in the necessity of closer observation in the prevention and care of industrial workers. With this committee's guidance the industries of this country have become conscious of the necessity of rearranging their medical service to take care of these changing conditions. Their work will certainly grow in usefulness and be a cardinal factor in postwar medicine.

The following doctors from New Orleans also attended: Dr. H. W. Kostmayer, Dean of the Tulane Medical School, Dr. B. I. Burns, Dean of the Louisiana State University Medical School, Dr. J. H. Musser, member of the Council on Medical Education and Hospitals of the American Medical Association, and Dr. Roy B. Harrison, Secretary of the Louisiana State Board of Medical Examiners and Past President of the Federation of State Medical Boards.

This was one of the strongest and most impressive gatherings of medical men probably ever assembled for such purposes. Many came with sincere determination to listen and learn. Others gave freely of their knowledge to those in attendance. The meetings were well conducted with liberal discussion of important subjects. There was a distinct evidence of simplicity, calling a spade a spade, and frequently one heard criticisms and sometimes praise for the accomplishments of different medical groups or organizations. There was a wonderful realism of interest displayed by doctors, and the unusual attendance implied *great interest in trying to secure adequate information on present and postwar planning.* There was a determination to review the mistakes that have been made and to try to rectify them to our advantage in the future. Although we know that the transportation facilities were not normal and hotels were packed and jammed with reservations, yet the attendance at these meetings was an *implication of the interest of the medical profession of this country.*

One can readily observe that I am of the opinion that the medical profession of this country is acutely interested and determined to solve the present day problems confronting them. This observation was gathered

not merely by listening to the presentations of the different speakers, but through personal contact and pseudo-round table discussions with important groups from different parts of the United States who are conversant with the many problems they have faced, either in failure or success in attempting to solve the medical problems. I was awakened to an optimistic view for the future of medicine by the concentrated efforts and accomplishments over the country. There were representatives of the eleven northwestern states who had grouped themselves together during the past few months in order that they might be able to carry on special functions. The principle one was to evolve a bureau of information in Washington, D. C., a bureau with a two way function, carrying information to Washington to every member of Congress and officers, and bringing back to the medical profession pertinent information and data from our capital.

We also saw there the determined and independent group from Indiana, American Association of Physicians and Surgeons of America, founded by the physicians of Lake County Society. This organization proposes to boycott federal medicine by preventing its members from practicing under any federal plan that may be imposed upon them, and other functions. It was my privilege to talk with the executive secretary of the state society and some of the men who figured in the planning of this new medical society for material economic benefits to the medical profession.

Then we were permitted to listen to the plan of the northeastern states. Out of all of this there was some predominating factors that were emphasized throughout the conference, namely, first, that it was apparenly evident that Senate Bill Number 1161 would not be passed by this Congress; second, that following termination of war activities this plan of social security would be renewed with vigor as a postwar measure. The medical profession was admonished not to relinquish their activities, not only in efforts to defeat this bill but carrying to the people the advantages of present American medicine. If the medical profession does not act to solve these problems, then we can expect again renewed activity to take over the practice of medicine by the federal government, the insurance companies, the Blue Cross plans, etc., and thus removing the solution of problems entirely from medical supervision.

The total attendance at these conferences was in the neighborhood of 1,500 doctors, and a great many others from allied groups.

Observations made at these conferences were as follows:

1. There was a serious determination to have defeated the proposed Senate Bill Number 1161. From all indications this will be accomplished.

2. To maintain in Washington, D. C. a two way medical bureau. At lot of emphasis was placed upon this particular function of organized medicine. Since these meetings, the Council on Medical Service and Public Relations of the American Medical Association has agreed to establish an office in Washington. Their functions, objects, and limitations will shorty be pronounced through official channels.

3. The widespread discussion for the establishment of some voluntary pre-payment insurance which they regarded as a duty and function of physicians not of the federal government. This might be regarded as a kick back from the Wagner Bill as a means of supplying medical service to low income groups. There was considerable discussion of plans, applications of medical service, and an outright expression of opposition to any form of pre-payment medical insurance. As a result of this discussion, there was evidenced a need for creating and making available to the various state societies the results of various pre-payment medical plans in order that the subject should be accorded consideration.

4. There was a distinct criticism of the American Medical Association for not taking a more leading part in the development of a medical bureau in Washington.

5. A comprehensive study of postwar medicine in re: medical education, relocation of physicians in critical areas, and the

preservation of high medical standards by the Federation of State Medical Boards.

6. Outstanding in these conferences were the forcible talks by the Honorable Walter H. Judd, Congressman from the Fifth District, Minnesota, an M. D., who was vitally concerned in helping the medical profession as far as possible in their problems, and especially in regard to legislation emanating from Congress. The Surgeon General of the Army, the Surgeon General of the Navy, the Surgeon General of the Public Health Service, and Dr. Martha M. Eliot, Director of the Medical Service of the Children's Bureau, honored the meeting with their attendance and presentation of valuable contributions.

You can gather from this relation of observations the importance of these conferences, and the secretary-treasurer of the State Society was particularly grateful for this opportunity, and returned feeling greatly enhanced in knowledge concerning medical problems, and broadened in concepts concerning the solutions of same.

TRANSACTIONS OF ORLEANS PARISH MEDICAL SOCIETY

April 3. Board of Directors, Orleans Parish Medical Society, 8 p. m.
April 4. Eye, Ear, Nose and Throat Staff, 8 p. m.
April 5. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 1:30 p. m.
Mercy Hospital Staff, 8 p. m.
April 6. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
Executive Committee, Baptist Hospital, 8 p. m.
April 10. Scientific meeting, Orleans Parish Medical Society, 8 p. m.
April 12. Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.
Touro Infirmary Staff, 8 p. m.
Women's Auxiliary, Orleans Parish Medical Society, Orleans Club, 3 p. m.
April 13. New Orleans Hospital Council.
April 17. Hotel Dieu Staff, 8 p. m.
Clinico-pathologc Conference, Baptist Hospital, 8 p. m.
April 18. Charity Hospital Medical Staff, 8 p. m.
April 19. Clinico-pathologic Conference, Charity Hospital Morgue Amphitheater, 130 p. m.
Charity Hospital Surgical Staff, 8 p. m.
April 20. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
April 21. I. C. R. R. Hospital Staff, 12:30 p. m.
April 25. Baptist Hospital Staff, 8 p. m.
April 26. Clinico-pathologic Conference, Marine Hospital, 7:30 p. m.
French Hospital Staff, 8 p. m.
Catholic Physicians' Guild, 8 p. m.
April 27. Clinico-pathologic Conference, Touro Infirmary, 11:15 a. m. to 12:15 p. m.
DePaul Sanitarium Staff, 8 p. m.
April 28. L. S. U. Faculty Club, 8 p. m.
New Orleans Hospital Dispensary for Women and Children Staff, 8 p. m.

During the month of March the Society held one regular scientific meeting. The program was presented by members of the LaGarde General Hospital. Col. Albert Upshur, Commanding Officer of the Hospital presided. Penicillin, Case Report by Capt. Wm. B. Thorning, M. C.; Coccidiodomycosis: (a) Clinical Aspects by Major John B. Plum, M. C.; (b) Case Presentations, Demonstrating Various Manifestations by Capt. Nathan Schaffer, M. C.; False Positive Serologic Test by Lt. Col. Sloan J. Wilson, M. C.

Dr. John M. Whitney recently attended a United States public health institute meeting in Atlanta.

Dr. George F. C. Fasting spoke on "Burns and Their Treatment" at a recent meeting of the Delta Society of Safety Engineers.

Dr. Urban Maes has been appointed to a cubcommittee of the Eighth Naval District's Manpower Survey Committee. This special subcommittee is concerned with problems of hospital and medical facilities.

Dr. Frank L. Loria has been elected chairman of the Surgical Section of Charity Hospital.

Dr. Henry D. Ogden attended the sixth annual Forum on Allergy in St. Louis.

Dr. Hilliard E. Miller attended a recent meeting of the American Gynecological Club, of which he is president, in Philadelphia.

Dr. E. Carroll Faust delivered the Smith-Reed-Russel Lecture at George Washington University.

Daniel J. Murphy, M. D.,
Secretary.

LOUISIANA STATE MEDICAL SOCIETY NEWS

CALENDAR

PARISH AND DISTRICT MEDICAL SOCIETY MEETINGS

Society	Date	Place
East Baton Rouge	Second Wednesday of every month	Baton Rouge
Morehouse	Second Tuesday of every month	Bastrop
Orleans	Second Monday of every month	New Orleans
Ouachita	First Thursday of every month	Monroe
Rapides	First Monday of every month	Alexandria
Sabine	First Wednesday of every month	
Second District	Third Thursday of every month	
Shreveport	First Tuesday of every month	Shreveport
Vernon	First Thursday of every month	

DR. CHARLES C. deGRAVELLES

Dr. deGravelles, president of the Louisiana State Medical Society, was born on Point Pleasant Plantation, November 21, 1883. He went to school in New Orleans, attending Rugby Academy, and then entered Tulane to obtain his degree of Doctor of Medicine in 1910.

Dr. deGravelles' initial location was in Patterson, Louisiana. He then moved to Morgan City where he remained until 1934 when he again changed his place of practice, moving to New Iberia where he has remained ever since, devoting most of his attention to internal medicine.

Our president has held many other offices in organized medicine of Louisiana. At one time he was president of the St. Mary Parish Medical Society and the Third District Medical Society. He served as councilor of the Third District from 1929 up until the time that he was selected as president. In 1927 he was made vice-president of the State Society. He served efficiently as chairman of the Committee on Medical Economics for several years.

Dr. deGravelles has been active in civic and educational activities. At one time he was president of the St. Mary Parish Board of Health, and he served on the school board of his parish. He was president of the Peoples State and Savings Bank in Morgan City, and he was a past president of the Rotary Club of New Iberia. He was also elected coroner of Iberia Parish and examining surgeon of the Southern Pacific Railroad. He has given much time to examining and classifying draft registrants. It should be noted that Dr. deGravelles is a member of the Phi Beta Phi Medical Fraternity, and a Fellow of the American College of Physicians.

We would like to repeat what we wrote last year.

"It is obvious that Dr. deGravelles has led a busy, active, and useful life. His interest has not been confined to medicine and the practice of medicine, but he has been a tremendous force for the betterment of the people of the parishes and cities in which he has lived. The broadmindedness of the new president, his loyal service to organized medicine in the past, and his wonderful character should make him an outstanding president of the State Medical Society."

The forecast that was made in the above paragraph has proved to be true. Dr. deGravelles has given loyally of his time to the State Medical Society, and has made himself one of our outstanding presidents.

DR. C. C. deGRAVELLES

FELIX JOEL UNDERWOOD

The annual orator of this year's State Medical Society meeting will be one of the most distinguished members of the medical profession of our sister state, Mississippi. Dr. Underwood needs no introduction to members of the Louisiana State Medical Society. He is known by many of them personally and by all of them by reputation.

Dr. Underwood has had a distinguished career in his chosen field of public health. He became interested in this subject when he served, shortly after graduation from the University of Tennessee, as a part time health officer in Monroe County, Mississippi. He then became full time director of this county health department and then was called to Jackson, the central office of the Mississippi State Department of Health. He became state health officer of Mississippi in 1924, a position which he still holds.

In addition to his present position, he serves and has served on many committees and boards. For example, he is one of the trustees of the Mississippi State Tuberculosis Sanatorium and of the Mississippi Children's Society. He has been at various times on the Board of Scientific Directors of the Rockefeller Foundation, a member of the Public Health Committee of the Commonwealth Fund, a member of the Planning Committee of the Conference on Children in a Democracy, as well as serving on innumerable other important committees and boards.

DR. FELIX J. UNDERWOOD

Dr. Underwood was president of the Southern Medical Association a few years ago. He is also a past-president of the Mississippi State Medical Association as well as president of the Southern branch of the American Public Health Association.

The State Society is fortunate in having this distinguished Mississippian to be its annual orator. He is a man of charming personality and a speaker of repute and fame. That which he will have to say to the Society will undoubtedly be something well worth hearing.

THE 1944 ANNUAL MEETING

This year we expect to have a very fine convention which will be a combination of a high grade scientific program and a number of opportunities to enjoy friends in amicable and social gatherings.

The Scientific Program, which is shown elsewhere in this issue of the Journal, is curtailed to sixteen papers and their discussions. This curtailment was made necessary because of the fact that our convention will consist of only two days of scientific papers as against three such days at former conventions. The papers will be limited to twenty minutes' reading time, with five minutes allowed for the first discussion and three minutes for the second and subsequent discussions. The Committee on Arrangements will insist upon the time schedule for the reading and discussions of the various papers. The Scientific Program is a varied and interesting one and will prove profitable to all of us.

We are arranging a Buffet Luncheon for the Members of the House of Delegates on Monday, April 24, 1944 at noon. In spite of war time restrictions, we will have a nice luncheon, without a whole lot of fancy trimming, for one must remember that we are at war and must not expect any more than our just share.

On Tuesday, April 25, 1944 we will have a luncheon for the whole membership, with the opportunity to sit and lunch with our friends. On Wednesday, April 26, 1944 there will also be a luncheon for the membership. By the way, it will not be necessary to bring your ration stamps.

On Tuesday evening, April 25, 1944 starting at 8 p. m., we shall have the President's address. The annual orator this year is a man who is well known to most of us and has earned a just reputation for being an eloquent and fluent orator. It is an honor for the Louisiana State Medical Society to be fortunate enough to have Dr. Felix Joel Underwood of Jackson, Mississippi, for our annaul orator.

One of the most impressive features of our conventions has always been the love and reverence shown for dead members. This year the In Memoriam will be delivered by our own Dr. James Quintus Graves of Monroe, Louisiana, who is es-

pecially qualified in reverence and feeling to render an inspiring address of this nature.

Arrangements have been made for the golfers, so bring along your old favorite clubs (if you cannot play without them). Clubs may be procured at the links, if necessary. Dr. Ashton Thomas is in charge of the golfing activities and you must come out and show the boys how golf should be played. Oh, yes! Prizes galore!

The Women's Auxuliary to the Lousiana State Medical Society has arranged a very fine program which is shown elsewhere in this issue of the Journal.

The Louisiana Coroners' Association will have its annual meeting at a luncheon at midday Tuesday, April 25, 1944. Dr. Charles Barker is president and Dr. C. Grenes Cole is acting as chairman for this luncheon-meeting.

Dr. Emmett Irwin reports that the Past Presidents will have their annual dinner on Monday evening, April 24, 1944.

For those who are interested in the Library of the Orleans Parish Medical Society and historical medical books, there has been arranged a wonderful display of these books in the Library at 1430 Tulane Avenue. Miss Mary Louise Marshall, the Assistant Librarian, will be very happy to act as personal guide and commentator on this worthy display on Monday afternoon, April 24, 1944, and Wednesday afternoon, April 26, 1944.

Now, the "piece de desistance" in the social way, will come on Wednesday evening, April 26, 1944, beginning at eight o'clock. Then we will dance and dine at the Annual Banquet which will be the finale of our convention.

It is the earnest wish of the Committee on Arrangements to have a very large attendance at this war time convention so that the membership may come to hear excellent scientific papers and revel in the company of old and new friends and return home greatly refreshed in mind and body.

Here's to a large attendance!

PROGRAM OF 1944 ANNUAL MEETING

Section on Medicine and Therapeutics

Dr. J. H. Musser, New Orleans, Chairman

1. The Causes of Syncope with Special Reference to the Heart—Dr. W. A. Sodeman—Dr. H. T. Engelhardt, New Orleans. To open discussion—Dr. H. T. Engelhardt, New Orleans.

2. General Considerations of Brucellosis—Dr. Harry J. Schmidt, Convent. To open discussion—Dr. Robert G. Lowe, New Orleans.

Section on Pediatrics

Dr. S. George Wolfe, Shreveport, Chairman

1. The Importance of Recognizing the "Border-Line" Case in Pediatrics—Dr. Clarence H. Webb—Dr. S. George Wolfe, Shreveport. To open discussion—Dr. Julian Graubarth, New Orleans.

Section on Nervous Diseases

Dr. H. Randolph Unsworth, New Orleans, Chairman

1. The Physician-Patient Relationship — Dr. Theodore A. Watters, New Orleans. To open discussion—Dr. Douglas L. Kerlin, Shreveport.

Section on Bacteriology and Pathology

Dr. Maurice Couret, New Orleans, Chairman

1. Food Poisoning—Dr. George H. Hauser, New Orleans. To open discussion—Dr. Waldo L. Treuting, New Orleans.

Section on Public Health and Sanitation

Dr. David E. Brown, New Orleans, Chairman

1. Clinical and Epidemiological Features of an Epidemic of Severe Pneumonitis in Southwestern Louisiana—Dr. Waldo L. Treuting—Dr. Byron J. Olson, Bethesda, Md. To open discussion—Dr. Arthur Vidrine, Ville Platte.

Section on Gastro-Enterology

Dr. Donovan C. Browne, New Orleans, Chairman

1. Psychosomatic and Medical Aspects of Peptic Ulcer—Dr. Robert A. Katz, New Orleans. To open discussion—Dr. A. A. Herold, Shreveport.

Section on General Surgery

Dr. Daniel J. Murphy, New Orleans, Chairman

1. Rupture of Intervertebral Disk—Dr. John A. Lane, Surgeon, United States Public Health Service, New Orleans. To open discussion—Dr. Dean Echols, New Orleans.

2. Further Observations on Carcinoma of the Stomach in a Large General Hospital—Dr. F. F. Boyce, New Orleans. To open discussion—Dr. Walter Moss, Lake Charles. Followed by—Dr. Joseph Heard, Shreveport.

Section on Gynecology and Obstetrics

Dr. J. W. Reddoch, New Orleans, Chairman

1. Pelvic Inflammatory Disease—Dr. William L. Bendel, Monroe. To open discussion—Dr. T. B. Sellers, New Orleans. Followed by—Dr. John Dicks, New Orleans.

2. The Role of Roentgen Pelvimetry in the Management of Pelvic Contraction—Dr. E. L. King, New Orleans. To open discussion—Dr. J. N. Ane, New Orleans. Followed by—Dr. J. D. Talbot, Shreveport.

Section on Eye, Ear, Nose and Throat

Dr. W. B. Clark, New Orleans, Chairman

1. The Value of Central Field Studies Over the Conventional Type of Visual Field Studies—Dr. Shelley R. Gaines, New Orleans.

2. Sinus Disease Producing Monocular Proptosis, with Case Reports—Dr. L. W. Alexander, New Orleans. To open discussion—Dr. Olin W. Moss, Lake Charles.

Section on Urology

Dr. J. R. Stamper, Shreveport, Chairman

1. Prostatic Obstruction and Some of Its Com-

mon Complications—Dr. Edgar Burns, New Orleans. To open discussion—Dr. U. S. Hargrove, Baton Rouge.

Section on Radiology

Dr. Lucien A. Fortier, New Orleans, Chairman

1. Roentgenologist as a Medical Consultant—Dr. Leon J. Menville, New Orleans. To open discussion—Dr. Lester J. Williams, Baton Rouge.

Section on Orthopedic Surgery

Dr. John T. O'Ferrall, New Orleans, Chairman

1. Management of Shaft Fractures of the Long Bones (Lantern Slides)—Dr. F. Walter Carruthers, Little Rock, Ark. To open discussion—Dr. H. Theodore Simon, New Orleans.

RAPIDES PARISH MEDICAL SOCIETY

At the regular monthly meeting of the Rapides Parish Medical Society on December 6, 1943, the following officers were elected for 1944: President, Dr. O. B. Owens; First Vice-President, Dr. A. L. Culpepper; Second Vice-President, Dr. H. A. White; Secretary-Treasurer, Dr. V. F. Chicola. Board of Censors, Dr. H. A. White, Dr. L. D. Gremillion, and Dr. O. B. Owens. Delegates, Dr. M. B. Pearce, Dr. M. H. Foster, Dr. H. H. Hardy, Jr. Alternates, Dr. F. A. Thomas, Dr. H. A. White, Dr. R. G. Bryant.

FIFTH DISTRICT MEDICAL SOCIETY

At a recent meeting of the Fifth District Medical Society the following officers were elected for the year 1944: President, Dr. D. T. Milam, Monroe; Vice-Presidents, Dr. F. H. Mecom, Caldwell Parish; Dr. N. G. Nasif, Catahoula Parish; Dr. L. L. Coleman, Concordia; Dr. J. P. Davis, East Carroll Parish; Dr. R. E. King, Franklin Parish; Dr. T. A. Deckle, Jackson Parish; Dr. J. B. Harris, Lincoln Parish; Dr. H. C. Sevier, Madison Parish; Dr. Guy D. Williams, Morehouse Parish; Dr. W. E. Jones, Ouachita Parish; Dr. T. M. Sayre, Richland Parish; Dr. J. Whitaker, Tensas Parish; Dr. C. C. Francis, Union Parish; Dr. D. W. Kelly, West Carroll Parish; Secretary-Treasurer, Dr. J. E. McConnell, Monroe; Delegate, Dr. W. V. Garnier, Bastrop; Alternate, Dr. Wm. L. Bendel, Monroe.

IBERVILLE PARISH MEDICAL SOCIETY

At a meeting of the Iberville Parish Medical Society held on January 20, 1944, the following officers were elected for this year: President, Dr. Edward C. Melton, Plaquemine; Vice-President, Dr. W. H. Wagley, Maringouin; Secretary-Treasurer, Dr. R. J. Spedale, Plaquemine; Delegate, Dr. B. O. LeBlanc, St. Gabriel; Alternate, Dr. R. J. Spedale, Plaquemine.

ACADIA PARISH MEDICAL SOCIETY

At a recent meeting of the Acadia Parish Medical Society the following officers were elected for the year 1944: President, Dr. C. D. Brunt, Iota; Vice-President, Dr. A. R. Morgan, Crowley; Secretary-Treasurer, Dr. S. R. Henry, Crowley.

NEW ORLEANS GRADUATE MEDICAL ASSEMBLY

The 1944 meeting of the New Orleans Graduate Medical Assembly held in New Orleans, March 6-9 was probably the most successful meeting the organization has ever held. There were a greater number of doctors in private practice than have ever attended before. The total regstration, 1,319, was not as large as the previous year when 1,799 men registered to attend the meeting. However, in that particular year junior students were invited to attend, and there were a very large number of doctors in the armed forces. Whereas in 1944 there were only 170 of these men, in 1943 there were 494. It is obvious that a very large number of the physicians of the armed services have left this country.

The breakdown of the figures in attendance show that the registrants included 130 members, 174 local doctors, 548 out of town physicians, 143 residents and interns, 185 senior students, and 139 exhibitors. The average attendance at each session was approximately 500.

This year 155 visiting wives came to New Orleans with their husbands.

Physicians came from 32 different states, as well as one who came from the Republic of Panama. The adjoining states of course showed the largest number of registrants, Texas leading with 108, followed by Alabama with 54, and Mississippi with 42. Three men registered from California, seven from Illinois, two from Massachusetts, five from New York, two from Pennsylvania, and four from Mississippi. These were the states that were the fartherest away from New Orleans.

AMERICAN UROLOGICAL ASSOCIATION

The annual meeting of the Southeastern section of the American Urological Association was held in New Orleans, March 2-4. Dr. Henry W. E. Walther was local chairman of this meeting. Dr. C. E. Burford, St. Louis, president of the American Urological Association, appeared on the program. Dr. Jeff C. Pennington, Nashville, Tennessee, former president of the association, likewise addressed the convention, as did Lieutenant Colonel Earl C. Lowry, Atlanta.

NEWS ITEMS

The Executive Board of the American Public Health Association announces the Second Wartime Public Health Conference and the 73rd Annual Business Meeting in New York City, October 3, 4, and 5, 1944. Meetings of related organizations will take place on Monday, October 2. Headquarters will be the Hotel Pennsylvania.

The United States Office of Civilian Defense today announced that its Chief Medical Officer, Dr.

George Baehr, will retire on March 1 after two and a half years of service. He will be succeeded by Dr. W. Palmer Dearing, who has been Assistant Chief Medical Officer since the establishment of the Medical Division of the Office of Civilian Defense.

The general oral and pathology examinations of the American Board of Obstetrics and Gynecology (Part II) for all candidates will be conducted at Pittsburgh, Pennsylvania, by the entire Board from Wednesday, June 7, through Tuesday, June 13, 1944. The Hotel William Penn in Pittsburgh will be the headquarters for the Board. Formal notice of the exact time of each candidate's examination will be sent him several weeks in advance of the examination dates. Hotel reservations may be made by writing direct to the Hotel.

INFECTIOUS DISEASES IN LOUISIANA

The Louisiana State Board of Health reported that for the week ending February 12 the following diseases were reported in numbers greater than 10. Influenza leads the list with 73 cases. This makes a total of almost 20,000 cases that have been reported in 1944. Then comes measles with 41 cases, pulmonary tuberculosis 34, pneumococcic pneumonia 26, chickenpox 20, mumps 19, meningococcus meningitis 17, unclassified pneumonia 14, and diphtheria 12. Nine of the unclassified pneumonias were reported from military sources as were four of the cases of meningitis. The following week ending February 19 there were listed 121 cases of influenza, 84 of measles, 44 of pulmonary tuberculosis, 29 of septic sore throat, 27 of mumps, 21 of pneumococcic pneumonia, 15 of chickenpox, and 10 of unclassified pneumonia. There was one case of poliomyelitis reported from Evangeline Parish this week. For the week which terminated February 26 there were listed 258 cases of measles, 163 of influenza, 42 of pulmonary tuberculosis, 40 of chickenpox, 23 of mumps, 19 each of pneumococcic pneumonia and unclassified pneumonia. There were nine cases of meningococcus meningitis reported this week, a total of 78 so far this year, and one case of poliomyelitis. The week which ended March 4 included the cases of venereal diseases for the preceding four weeks. There were 1,109 cases of gonorrhea, 1,069 of syphilis, 78 of chancroid, and 18 of lymphopathia venereum. Of the other diseases measles was well out to the front with 382 cases, following by 214 of influenza, 44 of pulmonary tuberculosis, 41 of chickenpox, 37 of mumps, 18 of unclassified pneumonia, 14 of pneumococcic pneumonia, and 12 of meningococcus meningitis. It was rather interesting that of the venereal diseases only a comparatively few were reported from military sources. They also reported two cases of meningitis and 12 of unclassified pneumonia. For the week ending March 11 influenza again led the list with 314 cases, followed by 211 of measles, 68 of mumps, 55 of chickenpox, 31 of pulmonary tuberculosis, 13 of unclassified pneumonia, and 10 of German measles. About half of the mumps cases came from the army, and seven of the 10 cases of German measles.

HEALTH OF NEW ORLEANS

The Bureau of the Census, Department of Commerce, reported that for the week which ended February 19 there occurred in the City of New Orleans 141 deaths, divided 95 white, 46 non-white. Twelve of these deaths were in children under one year of age. For the week which closed February 26, there was a considerable reduction in the death rate, these falling to 126, divided 77 white, 49 non-white, with 14 of the deaths in children under one year of age. The following week which came to a close March 4 found an increase in the number of deaths in the city, 155 of the citizens expiring, of whom 100 were white, 55 were colored, and 17 were under one year of age. The following week closing March 11 there were listed 131 deaths in the city, 89 white, 42 colored, with eight of these deaths taking place in children under one year of age. Since the epidemic of influenza has subsided there have been rather sharp reductions in the number of deaths in the city, as for example in the last week quoted the three year average has been 171.

CORRESPONDENCE

Louisiana State Medical Society,
1430 Tulane Avenue,
New Orleans, La., U. S. A.
Dear Dr. Talbot:

The Journal has been delayed en route to me because it has to follow me through several changes in address. My new A. P. O. number is 152; the address is otherwise unchanged. The Journal is not only of scientific interest to me but is the one means I have to keep in touch with the activities of my professional friends at home and in the services. I correspond with Henry Butker as a result of his letter in a past issue. Here in England I have met only one New Orleans physician, Major Henry Lindner, who is doing genito-urinary with a hospital unit from Syracuse University. Recently, I was associated for a month with a unit from Loyola University of Chicago. They spent several months training in New Orleans so we had many friends in common. My regards to the Society—keep the home fires burning.

Sincerely,
(Signed) Ed Guidry.

Captain E. R. Guidry,
390 Engineers,
A. P. O. 152,
c/o Postmaster, New York, N. Y.

DR. LOUIS JULIAN GENELLA

(1875-1944)

Dr. Louis J. Genella of Kenner, was born in New Orleans on January 9, 1875. He graduated in 1898 from the Tulane University School of Medicine,

and was assistant to Dr. Rudolph Matas for several years. He practiced medicine for fifty years here in New Orleans and Kenner where he went to live two years ago. Dr. Genella died in New Orleans on February 27, 1944. He leaves behind a large family and a host of good close friends. His death will be mourned by all of them.

In addition to his local medical activities, at one time Dr. Genella served in the World War, the Spanish American War, and was wounded in the World War I. He received the Purple Heart, the citation stating that he was wounded by shrapnel while administering medical care to some British soldiers.

DR. FRANK T. GOUAUX, SR.
(1883-1944)

One of our former presidents, as well as a former Third District councilor of the Louisiana State Medical Society, died March 19 at the Hotel Dieu in New Orleans after a relatively long illness. Dr. Gouaux practiced in Lockport ever since the time of his graduation from the Medico-Chirugical College of Philadelphia. He became a member of the State Society in 1914 and retained his membership until the time of his death.

The loss of Dr. Gouaux leaves a vacancy in the State Medical Society which shall be hard to fill. Dr. Gouaux was an energetic, lovable character, who was respected and admired by his fellow practitioners. Evidence of their admiration for the man is shown by the fact that he was elected to the highest position the medical society has when he was made president in 1929.

WOMAN'S AUXILIARY TO LOUISIANA STATE MEDICAL SOCIETY

ANNUAL MEETING HEADQUARTERS ROOSEVELT HOTEL

Registration Desk.....Mezzanine Floor

Mrs. Carroll F. Gelbke, General Chairman
Mrs. C. Grenes Cole, Vice-Chairman
Mrs. Roy B. Harrison, Vice-Chairman

Honorary Committee

Mrs. George J. Taquino — Mrs. John S. Dunn
Mrs. Edwin L. Zander — Mrs. C. C. deGravelles

Chairmen of Subcommittees

Mrs. Daniel J. Murphy.....Registration
Mrs. Daniel N. Silverman.....Information
Mrs. H. Theodore Simon.....Tickets
Mrs. Jerome E. Landry.....Publicity
Mrs. M. Earle Brown.....Transportation
Mrs. Louis Leggio.....Telephone
Mrs. Cassius L. Peacock and
Mrs. Joseph E. Brierre.....Flowers
Mrs. Edmond Souchon.....Tea
Mrs. Paul Lacroix.....Tea Girls
Mrs. Charles B. Odom.....Pages
Mrs. J. Kelly Stone.....Printing

MONDAY, APRIL 24, 1944

1:00 p. m. Registration — Mezzanine Floor — Roosevelt Hotel

3:00 p. m. Pre-Convention Executive Board Meeting—Parlor H

Mrs. George J. Taquino, Presiding.
Invocation—Dr. Julian B. Feibelman
Address—Mrs. Eben J. Carey, President, Woman's Auxiliary, American Medical Association, Wauwatosa, Wisconsin.

TUESDAY, APRIL 25, 1944

9:00 a. m. Opening Meeting, Louisiana State Medical Society—Grand Ballroom.

10:00 a. m. General Session—University Room
Mrs. George J. Taquino, Presiding
Invocation—Rev. John W. Hynes, S. J.
Address of Welcome—Mrs. John S. Dunn, New Orleans.
Response—Mrs. Charles M. Horton, Franklin.
Greetings from:
Dr. C. C. deGravelles
Dr. Edwin L. Zander
Dr. Daniel J. Murphy
Dr. Thomas B. Sellers
Dr. Val H. Fuchs
Address—Mrs. John Pierpont Helmick, President, Woman's Auxiliary, Southern Medical Association, Fairmont, West Virginia
In Memoriam—Mrs. S. M. Blackshear, New Orleans
Piano Selections—Mrs. Walter C. Hava
Presentation of Flowers—Penelope Matthews Martin and Mitylene Parham
Benediction—Rev. Skardon D'Aubert
Reading of minutes
Reports—State Officers
State Committees
Parish Presidents
Special Committees
Report of Woman's Auxiliary to Southern Medical Association—Mrs. Wiley R. Buffington, New Orleans
Report of Woman's Auxiliary to American Medical Association—Mrs. Edwin R. Guidry, New Orleans
Unfinished Business
Recommendations of Executive Board
New Business
Report of Nominating Committee
Election of Officers

Introduction and Installation of New Officers—Mrs. Arthur A. Herold, Shreveport
Announcements by New President
Adjournment

12:00 noon Post-Convention Executive Board Meeting, University Room—Mrs. Rhodes Spedale, presiding.

3:30 p. m. Tea—Patio Royale, 417 Royal Street In honor of Mrs. Rhodes Spedale.

OFFICERS
WOMAN'S AUXILIARY TO LOUISIANA STATE MEDICAL SOCIETY

Advisory Council

Dr. Thomas B. Sellers, Chairman, New Orleans
Dr. Broox Cleveland Garrett, Shreveport
Dr. George J. Taquino, New Orleans

Officers

President—Mrs. George J. Taquino, 18 Fontainebleau Drive, New Orleans.

President-elect—Mrs. Rhodes Spedale, Plaquemine.

First Vice-President—Mrs. W. R. Harwell, 715 Elmwood, Shreveport.

Second Vice-President—Mrs. A. D. Tisdale, Riverside Sanitarium, Monroe.

Third Vice-President—Mrs. D. B. Barber, Pineville.

Fourth Vice-President—Mrs. Thos. Richardson, Minden.

Treasurer—Mrs. Paul Lacroix, 3122 State Street Drive, New Orleans.

Recording Secretary—Mrs. E. Ellender, Houma.

Corresponding Secretary—Mrs. Waldemar Metz, 2437 Jefferson Avenue, New Orleans.

Historian—Mrs. Edward C. Melton, Plaquemine.

Parliamentarian—Mrs. M. H. Foster, Alexandria.

Chairmen of Standing Committees

Archives—Mrs. Jerome E. Landry, 2336 Milan Street, New Orleans.

Bulletin—Mrs. Cassius L. Peacock, 8415 S. Claiborne Avenue, New Orleans.

Cancer Control—Mrs. Edmond Souchon, 3136 Octavia Street, New Orleans.

Doctor's Day—Mrs. C. R. Gowen, 5900 Line Avenue, Shreveport.

Exhibits—Mrs. Donovan C. Browne, 4920 St. Charles Avenue, New Orleans.

Finance—Mrs. Roy Carl Young, 1811 Jahncke Avenue, Covington.

Hygeia—Mrs. Robert W. O'Donnell, 117 Stone Avenue, Monroe.

Indigent Widows—Mrs. Aynaud Hebert, 2013 Napoleon Avenue, New Orleans.

Legislation—Mrs. Roy B. Harrison, 2327 Napoleon Avenue, New Orleans.

Organization—Mrs. B. C. Garrett, 4700 Fairfield, Shreveport.

Press and Publicity—Mrs. M. C. Wiginton, Hammond.

Printing—Mrs. Willard Wirth, 402 Vincent Avenue, New Orleans.

Program—Mrs. DeWitt T. Milam, 1704 Island Drive, Monroe.

Public Relations—Mrs. John S. Dunn, 8410 Pontchartrain Blvd., New Orleans.

Red Cross—Mrs. Clarence B. Erickson, 423 Herndon Avenue, Shreveport.

Revision of By-Laws—Mrs. C. Grenes Cole, 4938 St. Charles Avenue, New Orleans.

War Participation—Mrs. Arthur D. Long, Jr., Baton Rouge.

Councilors

First District—Mrs. Daniel J. Murphy, 127 S. Solomon Street, New Orleans.

Second District—Mrs. Daniel N. Silverman, 47 Versailles Blvd., New Orleans.

Third District—Mrs. C. C. deGravelles, New Iberia.

Fourth District—Mrs. R. T. Lucas, 535 Perremont Road, Shreveport.

Fifth District—Mrs. A. G. McHenry, 1910 Riverside Drive, Monroe.

Sixth District—Mrs. A. W. Martin, 902 Virginia Avenue, Bogalusa.

Seventh District—Mrs. J. D. Frazar, DeRidder.

Eighth District—Mrs. H. O. Barker, Horse Shoe Drive, Alexandria.

OFFICERS
WOMAN'S AUXILIARY TO THE ORLEANS PARISH MEDICAL SOCIETY

President—Mrs. John S. Dunn, New Orleans.

President-Elect—Mrs. H. Theodore Simon, New Orleans.

First Vice-President—Mrs. J. Kelly Stone, New Orleans.

Second Vice-President—Mrs. Daniel N. Silverman, New Orleans.

Third Vice-President—Mrs. Edmond Souchon, New Orleans.

Fourth Vice-President—Mrs. M. Earle Brown, New Orleans.

Recording Secretary—Mrs. Lloyd J. Kuhn, New Orleans.

Corresponding Secretary—Mrs. H. F. Brewster, New Orleans.

Treasurer—Mrs. Jonas W. Rosenthal, New Orleans.

Parliamentarian—Mrs. Daniel J. Murphy, New Orleans.

Historian—Mrs. William Kohlmann, New Orleans.

Publicity—Mrs. Jerome E. Landry, New Orleans.

The Executive Board meeting of the Woman's Auxiliary to the Louisiana State Medical Society, held on February 17, 1944, at Orleans Club, in

New Orleans, was most interesting and though not as large a crowd as usual, (due to the present unsettled conditions of many members) it was a very enthusiastic meeting and a successful one. Immediately following the meeting a very delightful luncheon was served, with Mrs. Taquino as hostess, and it was indeed a very happy occasion for all privileged to be present.

The meeting was called to order by the president, Mrs. George Taquino and a very excellent report read of the regular activities of the organization that were carried out during the year, and of the new projects, such as, collecting of old surgical kits for Coast Guard cutters; also of having each auxiliary procure a speaker for their monthly meeting to familiarize the members with the "Wagner, Murray, Dingall Bill," and reporting that letters had been written to Louisiana Senators and Congressmen asking them to delp defeat this bill.

The treasurer, Mrs. Lacroix, gave her report and it was approved as read and was to be filed.

The parish presidents gave very excellent reports of the work done in their auxiliaries. Some very fine work is being done all over the state in all projects of the auxiliary.

Various committee reports were read. Our historian, Mrs. Milton asked for clippings and any material pertaining to auxiliary work that she may complete her history book.

The Indigent Widows Fund, as reported by Mrs. Hebert has a total of $154.25. She hopes to receive other donations soon. Mrs. Peacock reported twenty-two subscriptions to the bulletin. An outstanding report of Red Cross work was read by Mrs. Erickson.

The activity of auxiliary members on "War Participation" was shown in Mrs. Long's report. The doctors' wives participate in bond selling, canteen work and all other activities pertaining to the war effort.

Mrs. Souchon has sent letters appealing to members to participate in the Cancer Control Campaign in April. I am sure that she will not fail to get 100 per cent cooperation to this very important cause.

Mrs. Metz has been a very busy person with all the letters, cards, and lists she has written and a fine report she gave as corresponding secretary.

There being no unfinished business the president hurried on into the order of new business. Mrs. Taquino told of the plans being formulated for the state convention to be held in New Orleans, April 24, 25, and 26. The Executive Committee met February 21, to discuss plans for this meeting.

There was much discussion regarding the "Year Book" and it was decided it should not be printed as usual.

Mrs. Erickson moved that, in place of the regular Year Book being printed that a supplement containing a list of national and southern officers, the State Executive Board, the parish officers and state projects. In Memoriam is to be included. These supplementary pages could be made to size and slipped into the last Year Book.

Mrs. Long seconded the motion made by Mrs. Erickson. It was voted upon and unanimously carried.

It was voted that there will be no exhibits this year as the doctors are not having their usual scientific exhibits. Mrs. Silverman made this motion and it was seconded by Mrs. Wirth.

There was no further business so a motion to adjourn was in order, this was rescinded, however, when it was learned that Mrs. Long had a splendid report on the Memphis Fourth Regional Congress for the Women's Field Army for Concer Control. She and Mrs. Jones attended this meeting Jan. 30, 31, and Feb. 1, 1944. This report was read.

After the reading of the fine report, the meeting adjourned.

The members present were as follows: Mesdames Taquino, Spedale, Lacroix, Metz, Landry, Melton, Hebert, Harrison, Wirth, Dunn, Erickson, Cole, Long, Jr., Silverman, deGravelles.

Mrs. M. C. Wiginton,
Press and Publicity Chairman.

BOOK REVIEWS

When Doctors Are Rationed: By Dwight Anderson and Margaret Baylous. New York, Coward-McCann, Inc., 1942. Pp. 25. Price, $2.00.

This book was written for laymen. It gives the mechanism of the Procurement and Assignment Service, both from the standpoint of civilian and military needs. Excellent information is presented on how to be a good patient, how to choose a doctor and what one may expect of doctors. This part of the book could be read by doctors with a great deal of benefit to themselves. All in all it is well written and can be recommended as excellent reading and information to our patients.

VAL FUCHS, M. D.

Handbook of Nutrition, A Symposium: Prepared Under the Auspices of the Council on Foods and Nutrition of the American Medical Association. Chicago, American Medical Association, 1943. Price, $2.50.

This book represents the reprinting of a series of articles which appeared in the Journal of the American Medical Association. It is splendid for the medical profession that the American Medical

Association has collected in one volume these articles on the various phases of nutrition. The material is written by a group of authors who are outstanding figures in the world of nutrition. Without naming all of the authors of the different chapters, suffice it to say that men such as Bloor, DuBois, McCollum, Elvehjem, Cowgill, Sebrell, and Wilder are included. The reputation of these authors is a guarantee of the authenticity of the articles.

Several years ago the Journal of the American Medical Association printed a similar book on the vitamins, which was very well received. In this present work the chapters deal with various aspects of nutrition that were not covered in the original volume, and cover the field with entire adequacy. This book really is a "must" book. Every doctor should have it in his library for ready reference in his every day work.

J. H. MUSSER, M. D.

Modern Management of Colitis: By J. Arnold Bargen, M. D., M. S., F. A. C. P. Springfield, Ill., Chas. C. Thomas Co., 1943. Pp. 322. Price, $7.00.

Specializing within his specialty, gastroenterology, J. Arnold Bargen has unquestionably added an authoritative text on intestinal disease with his volume "The Modern Management of Colitis."

In his foreword Bargen justifies his publication of the text during this present strife. The reviewer feels he need not have made such a useless introduction for the actual text needs no justification at any time. This is an impressive and complete treatise covering every aspect of colonic disease.

In a brief introductory chapter the essentials of structure and function of the large intestine are reviewed. Adequate consideration on history and examination with instructive illustrations on rectal and roentgenologic examination highlight this section.

In limiting the meaning of the term "colitis" Bargen calls for reserve in the use of this title to actual inflammatory disease. This leads to the establishment of irritable colon as the preferable diagnostic term and rationalization for the consideration of this entity as a sociologic disorter related to social, economic or other maladjustments.

The types of ulcerative colitis, nine in all, are each elaborated upon with each thoroughly surveyed with consideration given history, definition, incidence, causation, pathology, diagnosis, roentgenography, complications and therapy. The differential diagnosis of these various types becomes apparent as the chapters are reviewed. Lack of consideration given amebic granulomas and a degree of incompleteness in presenting the therapeutic aspects of amebiasis are pertinent. The latter is not forgiven when one considers the specificity of the amebicides in contrast to the extensive treatise on the possibly effective measures used in thromboulcerative colitis.

In devoting a section to allergic colitis it is hoped by the reviewer that the author will stimulate allergists and gastroenterologists to thought. This is a relatively neglected aspect of disease of the colon about which little is known and a diagnosis which draws little respect from any other than the sufferer. It is applied too loosely and managed too carelessly. Bargen has developed this section as fully as is practical. Some may well questian his even suggesting oral administration of histaminase.

In a final chapter Bargen considers the conditions to be distinguished from colitis and thus concludes with meticulous thoroughness his excellent treatise on colitis.

The illustrations, throughout, totalling one hundred and forty-eight, are well selected and instructive. Case reviews add much to the interesting reading of the text. Departing from Mayo Clinic routine Bargen pleases the reviewer by not permitting statistics to overwhelm clinical information, rather he has been very practical in this respect and reveals his ability as a clinician, teacher and enterologist.

GORDON MCHARDY, M. D.

Reaction to Injury; Pathology for Students of Disease Based on the Functional and Morphological Responses of Tissues to Injurious Agents: By Wiley D. Forbus M. D. Baltimore, The Williams & Wilkins Company, 1943. Illus. Pp. 797. Price $9.00.

This book, according to the author's preface, is developed from the concept that "The essential element in disease is . . . the reaction of the individual, in the last analysis, the reaction of the individual cells that compose the tissues, to agents and influences comprising the environment. The individual is considered to be capable of reacting in only three essentital ways: (1) by resisting; (2) by submitting, and (3) by effecting an adaptation. These three reactions, therefore, are taken to be the basis of all disease, and the recognized disease entities are considered to be the expressions of the elaboration of one or several of these reactions."

The present volume contains two of the four parts the author believes to be necessary for the development of the plan of the book. Of these completed parts, part one bears the title introduction to the study of disease. This section, comprising approximately one-seventh of the volume, opens with a discussion of the relation of pathology to medical sciences and to clinical medicine. This chapter is followed by a general introductory discussion of the human body in relation to its external and internal environment and its manner of reacting to injury. The subsequent chapters serve to introduce in a broad way the author's concepts of the causation of disease. Part two is

entitled active resistance of the body to injury by endogenous and exogenous agents through essentially protective, morphological and physiological reactions of the tissues—the inflammatory reaction and the disease entities arising therefrom. This larger portion of the book contains a comprehensive chapter on inflammation. In the following sections the author describes the reactions of the body tissues to injury from bacteria, viruses, rickettsiae, treponemata, fungi and foreign bodies. It is in these sections that the specific description of disease entities, for example, rheumatic heart disease, nephritis, typhoid fever and tuberculosis, are presented.

In the remaining two parts (now being prepared) the author proposes to deal with "the submissive type of reaction" and with "the reaction of adaptation."

The present volume contains five hundred and thirty-two well chosen and instructive figures. Of these all but sixty have been prepared from the author's material. Twenty of the photographs have been reproduced in colors. Numerous selected references to the literature are listed under conspicuous headings at the ends of appropriate chapters or sections.

This book differs from the standard textbooks of pathology in several respects. Neoplastic diseases are omitted. The subject matter dealing with infections and with specific disease entities is presented in greater detail than has been customary. Particular attention is paid to the genesis and development of the anatomical lesions in each disease process and to the resulting functional disturbances.

In the reviewer's opinion this book represents a significant contribution to the available literature dealing with pathology. It should interest the student of medicine, whether he is an undergraduate or a practicing physician. In its present form it seems to be best suited to collateral or advanced reading. However, final appraisal of its suitability as a textbook for an initial course in pathology should await the publication of parts three and four.

GRANVILLE A. BENNETT, M. D.

Memoir of Walter Reed: The Yellow Fever Episode: By Albert E. Truby, Brigadier General, U. S. Army, Retired, New York, Paul B. Hoeber, Inc., 1943, Pp. 239. Price $3.50.

This little volume covers just what the title indicates—the yellow fever episode in the life of Walter Reed. It is not a biography of the man. General Truby was an interested observer of one of the greatest researches ever conducted—work that resulted in an epoch-making advance in the field of preventive medicine. He accepts the widely held view that Carlos Finlay originated the idea that led to this work while the Reed Board furnished the proof. Indeed, it is stated that Finlay provided the mosquito larvae used in at least some of the experiments. The remark of Joseph Goldberger who said: "Reed converted a discredited hypothesis into an established doctrine," evidently has General Truby's approval. Stress is laid on the fact that the Reed group constituted an Army board, not a commission, as often is erroneously stated. The work of this Board was much facilitated by the fact that the Governor General of Cuba at the time was an Army Medical Officer who had been transferred to the line and will go down in history as Major General Leonard Wood, a medical officer who gained fame as commanding officer of the line. No complaint is made as to any failure on the part of the other officers of the Army to give cooperation. The Reed group lost some time in trying to confirm or disprove Sanarelli's report, indicating the bacterial origin of the disease. The well-known observations of Dr. Henry Carter, of the Public Health Service, on yellow fever in the rural South, to use General Truby's words, "Became Reed's guiding light in working out the mosquito theory." The doubt that has surrounded the infection of Dr. Lazear with yellow fever is resolved by the statement that it could hardly have been an accidental infection, as often stated, but that Lazear put it in that light for personal reasons. General Sternberg, the Surgeon General of the Army, was very friendly to the mosquito idea from the start, but General Gorgas was convinced only after the first experience with the suppression of yellow fever in Havana, when for the first time the mosquito theory was put to a field test. One can hardly name a more widely accepted or readily adopted conclusion than that of the Reed Board, a tribute to the confidence of the medical profession in the Chairman. One authority remarked that this work was worth more than the cost of the Spanish-American War, a statement with which is is hard to take issue. The State Medical Society of Louisiana has established a Reed Medal to be awarded annually for outstanding work by a member of the student body of each of the two medical schools in the State, thereby honoring Major Reed and itself.

G. W. MCCOY, M. D.

A Surgeon's World: By Max Thorek, M. D. Philadelphia, J. B. Lippincott Co., 1943. Pp. 410. Price $3.75.

This is truly a delightful autobiography and it cen be read by physicians or the laity with a great deal of satisfaction and pleasure.

An autobiography is difficult to review in a limited space without going into many of the details of the author's life. Suffice it to say that Thorek came to this country as a Hungarian emigrant when still a boy. By dint of hard work, native intelligence, the ability to grasp every opportunity and the purposeful attempt to make a success of his life, he finally obtained recognition as one of the outstanding surgeons in the country. The account of his life is quite fascinating. The author

is a philosopher and a thinker; he not only philosophizes about medicine and people and life in general but more specifically he recounts many of his medical experiences with a large clientele, many of whom were persons of reputation and fame.

Throughout the book the reader can grasp the tremendous ambition that motivated the life of Thorek. To accomplish what he did he worked long hours and pushed himself to the physical limit. The success he made in his life could not have been obtained without this desire to succeed but his outstanding success is the result of a combination of a fine brain plus the willingness to work.

This book is recommended to any intelligent reader but it might be especially recommended to the neophyte in medicine or to the young man about to take up the study of medicine.

J. H. MUSSER, M. D.

Minor Surgery: By Frederick Christopher, S. B., M. D., F. A. C. S. Philadelphia, W. B. Saunders, 5th Edition, 1944. Pp. 1006. 575 Illustrations. Price, $10.00.

Dr. Christopher has always aimed to keep this book up to date, and has not allowed the present world conflict to interfere with its revision. Instead the fourth edition has been revised and many new phases of minor surgery have been added. Each subject is discussed briefly but completely, and theories are entirely omitted or only casually mentioned. The book is up to date and obsolete ideas have been depleted. However, since the revision of this volume, Dr. Christopher has changed his opinion regarding salt metabolism.

One completely new chapter on "Preoperative and Postoperative Care" has been added which includes subjects of increasing importance to the surgeon. Among these are dehydration, hypoprothrombinemia, vitamin deficiency, pulmonary complications, prophylaxis and treatment of thrombosis and embolism, and postoperative urinary complications arising from the use of the sulfonamides.

Throughout the various chapters, many subjects and ideas are treated for the first time and due emphasis is placed on them.

A brief bibliography is given with each chapter.

The reviewer feels that this is an outstanding volume on minor surgery, and should be of great value to both the student and the practitioner.

REYNOLD PATZER, M. D.

Biomicroscopy of the Eye: By M. L. Berliner, M. D. Vol. I. New York, Paul B. Hoeber, Inc., 1943. Pp. 709. Price, $16.50.

Ophthalmology is indebted to the author of this outstanding work, which is the most comprehensive and comprehensible on this subject yet written. Its 709 pages of text are supplemented by 282 black and white and 250 excellently colored illustrations. The first three chapters are devoted to the development and technic of biomicroscopy and to a description of the several makes of biomicroscopes. The conjunctiva, normal and abnormal, including noninflammatory, inflammatory, and traumatic lesions and tumors, is then presented. The lid margins, sclera and cornea are discussed in somewhat the same manner. The last chapters deal with the anterior chamber and gonioscopy.

This book will be of value especially to younger ophthalomologists because it presents the fundamentals of this important subject in a systematic and orderly manner and is written in a very lucid style. The second volume on the biomicroscopy of the lens and vitreous is to be published in 1945.

CHAS. A. BAHN, M. D.

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